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LEGEND AND LANDSCAPE:

CONVERGENCE OF ORAL AND SCIENTIFIC TRADITIONS WITH  
SPECIAL REFERENCE TO THE YUKON TERRITORY, CANADA

by

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John M. Crueshank



## ABSTRACT

The paper examines two distinct intellectual traditions in the north, Native oral tradition and western scientific research. It begins by discussing my own anthropological field research in the southern Yukon Territory, Canada, the present interest of natural scientists in oral tradition, and the cultural context within which the narratives should be viewed. It then looks at oral tradition and western science as contrasting theoretical frameworks and discusses the strengths and limitations of each.

With this background, examples of 'convergence' of the two traditions in the southern Yukon are discussed. Oral traditions about glacier movement and impounded lakes, climatic fluctuations, geography and geology, fauna and flora, and prehistory are compared with present day scientific research about the same phenomena. Scientific interest in oral narrative elsewhere in the circum-polar north is summarized.

The suggestion emerges that in combination the two approaches can provide a broader perspective on the natural environment than can either by itself, particularly if linguistic categories used by Native speakers can be correlated with scientific knowledge of the same phenomena. Oral history and linguistic research may have a contribution to make to an 'anthropology of natural history'. Oral tradition must be seen as a distinctive intellectual tradition, not simply as an adjunct to western science.

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## INTRODUCTION

This paper examines two distinct intellectual traditions in the north - Native oral traditions and western scientific research. Each developed from a very different institutional and cultural setting and each is transmitted by a very different method of communication. Each tradition has generated different theories about the natural world.

The issue which I will examine can be set out as follows: Some scientists working in the Arctic and sub-Arctic are studying phenomena about which Indians and Inuit have longstanding oral traditions. Several of these scientists have expressed an interest in learning these traditions in relation to their own work, particularly because there are so few historical documentary sources available in the north. Does a non-literate society have in its oral tradition anything which makes an essential contribution to scientific knowledge which science can obtain from no other source? Is it possible to 'translate' information about the natural world from one tradition to another? Can oral traditions be helpful to scientists or are they so rooted in cultural context that they may simply mislead or confuse someone from a western tradition? Or, to rephrase the question with a somewhat different bias, can someone trained in a western rationalist framework really make any claims to understand cognition which considers time, space, causality, materiality as secondary characteristics of the universe? (Heuscher 1979, p.244-45).

My own interest is in oral narrative, specifically in

anthropological interpretations of myth. The selection of this topic emerged directly from the interdisciplinary nature of the Diploma in Polar Studies Programme at the Scott Polar Research Institute; this programme examines northern research in physical sciences, social sciences and humanities. An examination of the relationship between oral tradition and science necessarily considers linkages among these various branches of study. The materials presented here will focus on the Yukon Territory, Canada, but conclusions may be more broadly applicable to other areas of the circum-polar north.

Section I provides some background to the discussion: my field research in the Yukon Territory, the interest of some scientists in oral tradition and the cultural context within which narratives must be viewed. Section II examines oral tradition and science as two different theoretical frameworks for understanding the world and considers some of the strengths and limitations of each. Section III presents some applications of the two frameworks to the natural environment in the Yukon: glacier movement and impounded lakes, climate, mineral resources, map making, fauna and flora, prehistory, volcanic eruptions and earthquakes. Section IV gives a brief overview of similar research in other parts of the circum-polar north. The concluding section offers some observations about the validity of incorporating oral traditions into scientific investigation in the north.

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SECTION I

THE RESEARCH CONTEXT

I.1 Background of Research

Between 1974 and 1979 I worked intermittently with several elderly Native women in the southern Yukon Territory who wanted their biographies recorded and transcribed for their families. My initial interest was in learning something about how northern women's lives were changing and how these changes were reflected in personal histories. After some months of work, the three oldest women, all born before 1900, began to shift emphasis away from personal history to traditional stories which they wanted duplicated and distributed to a wider audience. This was done with assistance from the National Museum of Canada, the Council for Yukon Indians, the Yukon Indian News and the Department of Education, Government of the Yukon Territory (Cruikshank 1977, 1979a, 1979b, 1979c).

In all, more than 100 stories of varying length and complexity were recorded, transcribed and distributed<sup>1</sup>. While I believe that the majority of these narratives reflect a specific view of the social order and women's place in it, a number of the narratives are concerned much more directly with the nature of the physical environment. These latter stories are of central interest to this paper. It should be stated at the outset that the content of these stories is never exhausted by materialistic explanations, which often just skim the surface, and it is not the intent of this paper to do this.

Oral tradition has been defined succinctly as "oral testimony



transmitted verbally from one generation to the next or more" (Vansina 1971, p.444). Anthropologists and classicists tend to divide traditional narratives into two genres, myth and legend. 'Myth' tells of a time different from historical time as we know it, and describes origins and transformations of the world as it now appears. 'Legend' may be highly embellished but it can usually be traced to an historical event. This paper considers both legends about landscape and myths which provide a non-western perspective on the natural environment.

#### I.1 Northern Scientific Interest in Oral Tradition

In speaking of science I am referring to science broadly as " ... the human activity of finding an order in nature by organizing the scattered meaningless facts under universal concepts ... such creations of the mind as gravitation" (Bronowski 1977, p.225). Some scientists have demonstrated interest in learning Native oral traditions which relate to their research. While examples will be discussed later in the text, a list of some demonstrates the kinds of interest.

Two archaeologists documented examples of how Native American traditions, passed on for several centuries, have been confirmed by independent archaeological or geological reports (Pendergast and Meighan 1959; Meighan 1960). A geographer cited four Eskimo testimonies recorded in journals of explorers or anthropologists which he interpreted as reflecting an understanding of isostatic rebound (Spink 1969a). A historian works with scientists at the University of East Anglia's Climatic Research Unit evaluating the strengths and weaknesses of Icelandic

tradition in reconstruction of that island's climate (Ogilvie, personal communication; Ogilvie 1978; Bell and Ogilvie 1978). One geophysicist in Alaska is recording traditions associated with sea ice on the north Alaska coast; another hopes to record oral traditions as evidence of volcanic eruptions at Mount Wrangell (Benson, personal communication). A glaciologist working in the St Elias range of mountains, south-west Yukon, considers that traditions recorded in the Yukon may help to reconstruct events surrounding the emptying of a glacier-dammed lake in the area (Clarke, personal communication). A dendro-climatologist from Columbia University who is reconstructing past climates in northern Canada is interested in Yukon traditions about an extremely cold summer during the last century (Jacoby, personal communication). The director of a major archaeological project at Old Crow Flats in the northern Yukon has emphasized the importance of data obtained from oral history (Irving 1975, p.1455). Even if the verbal record only supports a scientist's hypothesis, it helps him to develop that hypothesis with greater assurance.

At another level, scientists have been trying to reconstruct the impact of geological, climatic and environmental processes on early human populations in the north (Black 1976; Barry and others 1977). Oral traditions could play an important role in such studies.

### 1.3 The Cultural Context of Oral Tradition in the Yukon Territory

Anthropologists have stressed repeatedly the need to view oral traditions in a broader cultural context (Durkheim 1915;

Boas 1938; Malinowski 1954). The British functionalist school of anthropologists carried the idea of context to an extreme by considering only the context rather than the narrative form worthy of study, particularly the functions performed by traditions in maintaining the social structure. Myth was considered to be derived not from rational inductive observations of natural phenomena; rather it was treated as a body of tradition handed down to the individual by the community in which he was submerged, a social force exerting a practical function in day-to-day life. Such analysis considered only those aspects of narrative which contributed to a wider analysis of community organization (Colby and Peacock 1975, p.614-15).

North American cultural anthropology has shown more interest in analysis of actual texts, viewing these in the context of the narrator's personal history as well as culture (Boas 1904; Garfield 1953; McClellan 1970a; Colby and Peacock 1975, p.617-31). Recently historians, too, have begun to argue that oral tradition has important historical content; however, they stress that it is impossible to evaluate the importance of a text without a clear understanding of its social meaning in a historical and geographical milieu (Vansina 1971, p.446).

It is useful to outline briefly the cultural context of southern Yukon Indian society at the end of the last century in order to delineate the economic, social, linguistic, historical and educational setting within which present day narrators grew up, and some of the influences on their stories.

(a) Traditional Economy

Aboriginally, Natives of the southern Yukon Territory

were hunters and fishermen. Animal and plant resources on which they depended varied cyclically; hence families migrated over large areas of land to obtain food, clothing and shelter. In summer, people fished. In late summer and autumn they hunted and dried meat. In winter they tried to minimize unnecessary movement. Trapping fur bearers predominated in spring. Because of the unpredictability of the natural environment they had to be prepared to modify their annual movements when necessary. People tended to live in relatively small groups of perhaps two or three hunters with dependents. Somewhat larger groups gathered at fishcamps in summer. There were no permanent settlements before the end of the century. People developed an intimate knowledge of the land from which they derived their livelihood.

(b) Social Relations

Social relations in the central and southern Yukon were clearly structured by a matrilineal moiety system, a bipartite division of society. Each individual automatically belonged to the same moiety as his or her mother, and rights, obligations and even oral traditions were passed on through the female line. Marriages were exogamous; that is, each individual was expected to marry someone from the opposite moiety and marriage within one's own moiety was tantamount to incest. Marriage, then, was an alliance between kin groups reinforcing a whole series of rights and obligations. Rules of moiety reciprocity guided behaviour at birth, puberty, death, visiting, story telling, distribution of food and other occasions. Political leadership also functioned within kinship rules.

Yukon Indians, then, combined the characteristic independence

of sub-Arctic hunters with clear social ideals of cooperative behaviour appropriate to the sharing of resources, activities and work.

(c) Languages

Most of the languages spoken in the Yukon are classified by linguists under the general term Athapaskan, the dominant language "family" in north-western Canada and Alaska (see Map 1, page 9). Athapaskan languages are also spoken as far away as northern California and the south-western United States (Navaho and Apache, for example). In the Yukon, they include Kutchin (also written Gwich'in) in the northern Yukon, Han spoken near what is now Dawson City, Tutchone in the central and southern Yukon, Kaska in the south-eastern Yukon and Tagish, an almost extinct language in the southern Yukon (see Map 2, page 10).

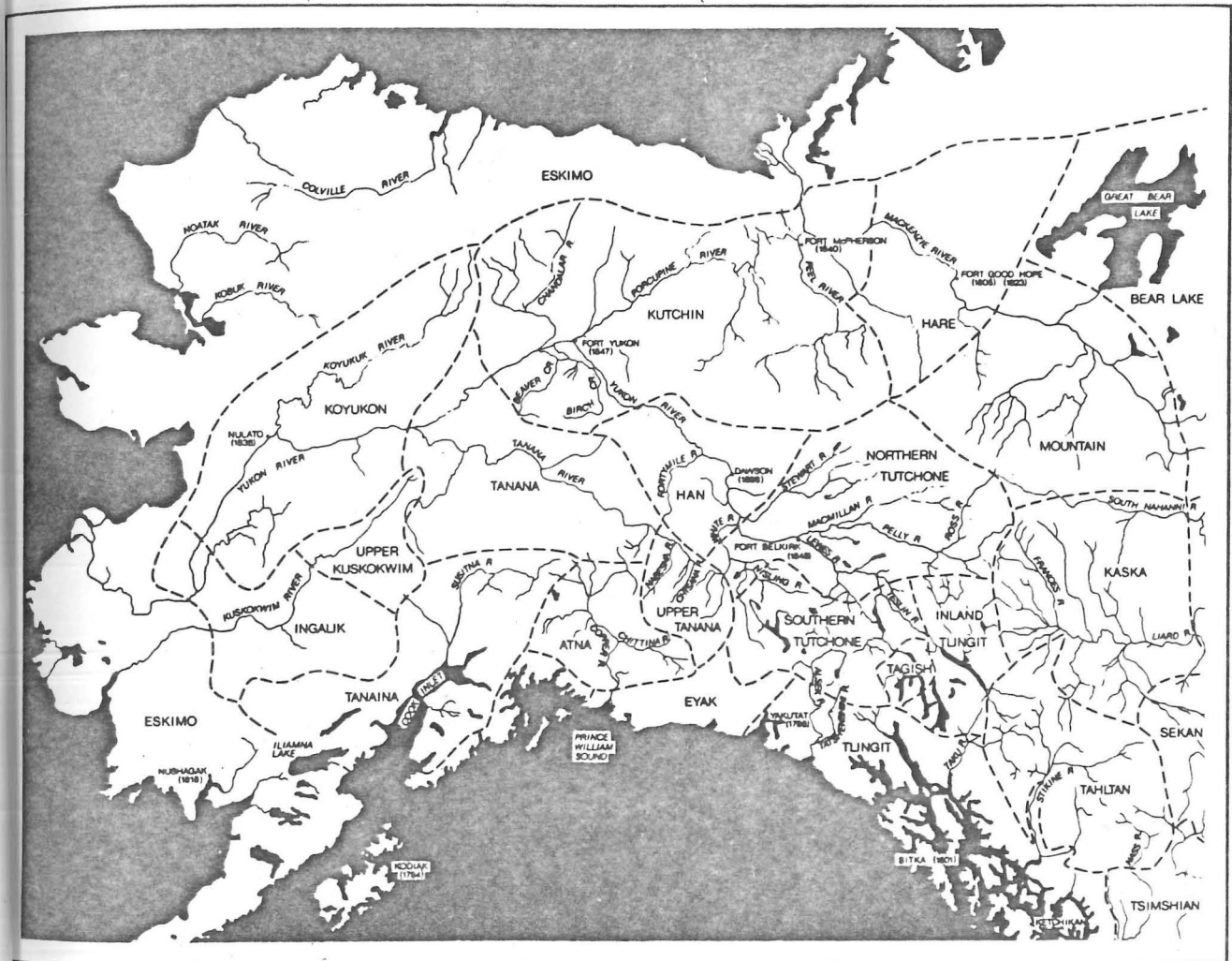
Tlingit, spoken in the extreme southern Yukon is a coastal language very different from Athapaskan languages. Some time during the last century, Tlingit speakers moved into the southern Yukon and neighbouring Athapaskan groups adopted Tlingit words and some of their customs. Athapaskan linguistic research has begun relatively recently in this region but a great deal of work is currently in progress in Alaska and northern Canada (see Krauss 1973).

(d) Historical Change

For at least a century before they had direct contact with whites, Yukon Indians were involved in trade relations with coastal Tlingit who acted as middlemen, bringing European goods from the Russians and British on the Pacific coast to the interior and taking back furs. In effect they were colonized by the

Map 1

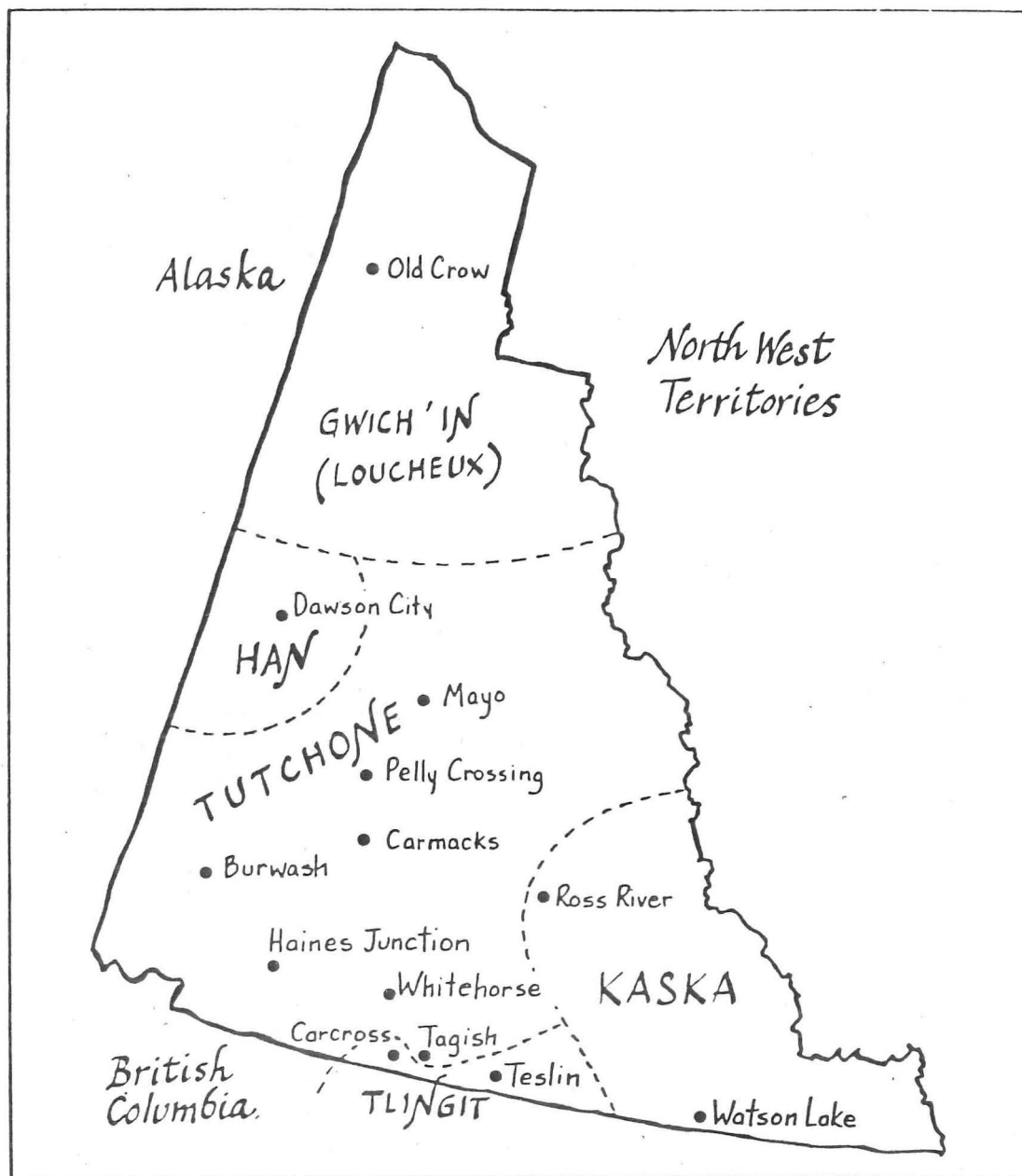
Native groups of North-western North America  
(after McClellan 1975, Map 1).



Map 2

Yukon Native languages

(Map produced by Yukon Native Languages Project)





Tlingit who clearly had the upper hand in the trade relationship. Much of the feeling of these days is retained in oral tradition.

The Klondike gold rush broke the Tlingit monopoly and for the next three decades Yukon Indians negotiated directly with white traders, miners, missionaries and other entrepreneurs who had come north. With characteristic willingness to adapt, some built permanent year-round homes near the posts and took seasonal wage employment in the dominant white economy, especially on riverboats and in woodcamps. The second 'rush' which took place during the construction of the Alaska Highway in 1942 permanently enforced a new settlement orientation. The ability of Athapaskans to adapt to new circumstances when necessary has been repeatedly mentioned by ethnographers and is also reflected in oral narratives.

#### (e) Role of Oral Tradition

Oral tradition had a central role in transferring knowledge from generation to generation. Until recently, Yukon Indians acquired all their knowledge either from their own experience or from the descriptions of others. An explanation by an 85-year-old woman was typical:

In the early days we learn from our grandmothers. They tell us a story and we listen all the time. Now we try to teach our kids. We talk to them about what is right. We remember what our people say. Now kids get too much movies, TV, all kinds of things. Don't learn language. Don't learn things. Try to be Whiteman. This is no good.

While women usually told stories informally to children, the oldest men repeated the traditions publicly. Most of the women with whom I worked agreed that they had learned many of the traditions from uncles and grandfathers (particularly matri-



lineal kin).

Much of the intellectual interest of Yukon Indians focussed on supernatural powers and this theme occupies a central place in Athapaskan mythology (McClellan 1975, p.91). Mythological stories address the uneasy balance between culture and nature, man and environment, and the symbolic journeys taken by men and women beyond the realm of ordinary reality. While it is relevant to this discussion, it is impossible to delve into themes in Yukon Indian myth without making them the central focus of the paper.

The remainder of this paper attempts to examine some of the problematic issues associated with the use of oral traditions (specifically Athapaskan traditions) by scientists. It is only a preliminary exploration of the problems, because recording narratives about natural phenomena was never the main focus of my research. It may, however, set parameters for more systematic investigation in the future.

## SECTION II

### ORAL TRADITION AND SCIENTIFIC TRADITION:

#### CONTRASTING FRAMEWORKS

##### II.1 Cognition, Literacy and Knowledge

Ever since the Renaissance, it has been a feature of western intellectual tradition to distinguish between western and non-western, 'primitive' and 'modern' thought as though intrinsic differences separate the two. Obviously this sort of discussion takes place within a western framework, using a multi-dimensional western standard.

Anthropology developed very much within this tradition and has contributed to the dual classification system, particularly in distinguishing non-western beliefs from western science. Within this framework, for example, western tradition is viewed as embodying 'objective knowledge' and non-western traditions are interpreted as 'magic' or 'religion' rather than technical thinking. Significantly, many anthropologists now question the value of using religion as an analytical category since it has become clear that there is no cross-culturally valid definition of religion: often it becomes a catch-all dustbin category for behaviour considered unintelligible within a rationalist framework. The categories which anthropologists use to describe traditional societies may reflect more about their own societies than those which they propose to study. The contemporary debate in anthropology about whether one can use formalist models applicable to all societies, or whether one must study a society on its own terms, using its own classification system, reflects

this controversy (see Frake 1969).

Cross-cultural cognition is of particular interest to anthropologists and linguists.

Levi-Strauss argues that contrary to conventional western beliefs 'primitive' people view the world intellectually rather than just materially; for them, as for modern western man, classification of environmental phenomena is extremely important

I see no reason why mankind should have waited until recent times to produce minds of the caliber of a Plato or an Einstein. Already, over two or three thousand years ago, there were probably men of similar capacity, who were of course not applying their intelligence to the solution of the same problems as these more recent thinkers; instead they were probably more interested in kinship (Levi-Strauss 1968, p.351).

Levi-Strauss distinguishes two modes of scientific thought or "two strategic levels at which nature is accessible to scientific inquiry": one is at a level of perception and imagination, the other at a more abstract level; one culminates in the science which led to neolithic agriculture, the other in modern science (Levi-Strauss 1966, p.15). Whether or not we agree with his 'two science' approach, it is clearly the perceptive, empirical nature of traditional Indian and Inuit knowledge, the astute observations made over many years of living, which are of interest to modern scientists working in the north.

Some of the best writing about the nature of cognition in non-western societies comes from Africa. Conclusions from this work may be more broadly applicable. While acknowledging that there are real differences between traditional African thought and western scientific thinking, Robin Horton finds certain similarities in the two processes, particularly in their

search for general explanatory theories:

The quest for explanatory theory is basically the quest for unity underlying apparent diversity; for simplicity underlying apparent complexity; for order underlying apparent disorder; for regularity underlying apparent anomaly. (Horton 1976, p.1).

However, says Horton, while the two traditions do share certain similarities, they differ in their awareness of alternatives: African tradition resists alternative explanations of phenomena; modern science is based on highly developed awareness of alternatives. African communities react with anxiety to threats to their theoretical tenets; science is (at least ideally) based on constant reassessment of the theoretical underpinnings (Horton 1967, p.156). This dichotomy may apply less to northern Athapaskan traditions, where one characteristic of narrators is their willingness and ability to incorporate new events and ideas rather than to reject them out of hand.

Professor Jack Goody considers the distinction between modes of thought inadequate and suggests that it is simply our arbitrary western classification system trying to make our world view appear orderly:

... the division of societies or modes of thought into advanced and primitive, domesticated or savage, open or closed, is essentially to make use of a folk-taxonomy by which we bring order and understanding into a complex universe. But the order is illusory, the meaning superficial ... the categorization is often value laden and ethnocentric (Goody 1977, p.36).

Literacy, he says, can account for the shift in perspective, because once people can write things down, they can store information and inspect it. This permits criticism and the growth of cumulative knowledge, the basis of western science.

Goody also points out that in any case it is not possible to talk about two distinctive modes of thought, because both are present not only in the same societies but in the same individuals.

This is a point which seems critical in discussions about traditions in the circum-polar north where 'traditional' and 'modern' perspectives regularly co-exist.

Linguists have long debated this issue from the perspective of language. During the 1920's and 1930's, Edward Sapir and Benjamin Lee Whorf published articles suggesting that one's view of the world is dependent on the language one speaks. Language, they said, was not simply a technique of expression but a way of classifying sensory experience in a cruder but broader way than science. Whorf argued, for example, that the metaphysical framework of Hopi grammar with its "built-in calculus" might be better equipped than English to deal with concepts of modern Einsteinian physics. Hopi verbs are extremely complex but have no tenses. Time and space are inseparable in the language. Verbs focus on the contrast between particle and field of vibration and seem ideally suited to describe wave particle theory or relativity physics (Whorf 1956, p.51-56).

While the Whorfian hypothesis is attacked directly by some contemporary linguists like Chomsky who argue that language has an innate basis, all linguists would agree that language is fundamental to any study of cognition. Some linguists (especially those dealing with Athapaskan languages in north-western Canada and Alaska) argue, like Goody, that a fundamental pre-requisite for continuing development of languages in the twentieth century is literacy, the development of orthographies for each language.

Athapaskan scholar Michael Krauss recently testified at an Inquiry in northern Canada:

... no language, including English, is from the linguistic point of view intrinsically better equipped to deal with the modern world, whether it would be the flying of a jet plane or operating an X-ray machine than Dogrib, Inuit, Hebrew, Japanese, or an Australian aboriginal language. If God created anything equal in this world, it was language. The basic structures of the native languages are perfectly capable of handling modern ideas and concepts. The only thing that is lacking in the case of the so-called underdeveloped languages is the necessary lexicon, the vocabulary for dealing with the new material and the technological concepts that have been introduced (Krauss 1976, p.29971).

This, he argues, can develop only after a writing system is in use for these languages.

All of these theses share a common recognition that 'traditional thought' shares a good deal with 'scientific thought'. It can be argued, then, that Native observations about the natural environment are just as objective as those of western scientists, though they are interpreted within different frameworks. It is to a comparison of the frameworks which we must turn to consider how they differ.

## II.2 Oral Tradition

The attitude of an oral society toward speech is similar to the reverence of members of a literate society to the written word (Vansina 1971, p.442).

In recent years historians have shown considerable interest in oral tradition. It is no longer a question of whether oral tradition includes historical knowledge but how much is present, how long a time span it covers, how valid it is (Meighan 1960, p.59; Vansina 1965; Vansina 1971, p.464).

The importance of viewing oral traditions within cultural

context has already been stressed. On the following pages it may be clearer to talk about characteristics of narrative in a specific culture by summarizing both these features which are attractive to historians and scientists and those which present limitations. Examples, then, are cited from northern Athapaskan society in the region of the present Yukon Territory; however, some of the principles are more broadly applicable to oral literature generally.

(a) Attractions of oral traditions as evidence

(i) Persistence Most aspects of northern Athapaskan culture have changed enormously during the last century. The Klondike gold rush, the intensified fur trade, the construction of the Alaska Highway, the introduction of government programmes and schools, the attempts to industrialize the north: these things have affected every aspect of people's lives. However, oral traditions continue to be important to adults, particularly older people. Stories recorded in Sitka in 1883 by Aurel Krause, in Sitka and Wrangell in 1904 by John Swanton, and at Dease Lake in 1914 by James Teit are still told by women living in the Yukon in the mid-1970's (see Krause 1956, p.197; Swanton 1909, Tales 5, 13, 19, 77, 99, 100; Teit 1917, p.446, 464). This deep conservatism of Yukon oral tradition is one of its chief attractions to scientists and historians.

(ii) Individual variation and consistency Despite this general persistence, Athapaskan narrators do not seem to be bound as rigidly by a 'fixed' form of traditional narrative as are narrators in some societies. That is, individual narrators exercise considerable flexibility in narrative style. McClellan



recorded 11 versions of a particular story in the southern Yukon Territory and showed how each narrator embellished or developed aspects of the story congruent with his or her own life (McClellan 1970a). What does persist in the different versions is the structural arrangement of the story elements, and this seems to preserve at least some of the essential content. While individual narrators may all tell slightly different versions of one story, the women with whom I worked were most consistent in their own versions; that is, the same woman telling me a story at one point in time and then repeating it a year or two later told the story remarkably consistently, using similar words and phrases and insisting on the importance of 'getting it right'. Again, this kind of conservatism is important to a historian or scientist provided he makes the effort to get as many different versions of a tradition as possible.

(iii) Integration of historical events McClellan has documented the tendency of Yukon Athapaskans to incorporate historical events into traditional narrative and this is confirmed by my own data. Native perspectives on the Klondike gold rush, the arrival of the first whites and well-known historical figures are embedded in oral literature; in fact, the narrative style seems quite responsive to incorporating new materials using a traditional structure (see McClellan 1970b; Slobodin 1975). In the same way, accounts of natural catastrophes which are of interest to northern geologists, glaciologists, archaeologists and climatologists often become part of oral tradition (see Sections III and IV below).

(iv) Oral tradition as technology Anthropologists often



equate myth and legend with religion or magic rather than with technical thinking. Yet from the narrator's perspective, traditions often contain highly technical information. Surviving in a sub-Arctic environment by hunting, fishing and gathering requires detailed observations of one's environment and transmission of that knowledge from generation to generation. Years of observation are reflected in linguistic categories or in narrative.

Anthropologist Robin Riddington suggests the hypothesis that oral tradition is a critical adaptive strategy for hunters and gatherers. He argues that the conceptual ability to recreate, through language, a situation for someone who has not experienced it directly is a highly adaptive technology carried in the mind rather than in the hand, and coded in tradition rather than in heavy material encumbrance. Accurate transmission becomes critical for survival of the group (Riddington, unpublished paper).

Such content is often the same kind of detailed observation valued by scientists.

(v) Duration of observations Oral traditions may provide detailed observations of natural phenomena over long periods of time. Such observations are made over a lifetime and in all seasons whereas scientists are often limited to short field trips during summer.

(vi) Absence of documentary sources In an area where most written documents date from the beginning of this century, oral tradition is a significant source of historical information. With such a shallow historical base for their observations, northern scientists may well dispute the validity of evidence

in narrative but they cannot afford to ignore it.

(b) Limitations of oral traditions as evidence

(i) Cultural context Traditions passed on orally begin with very different premises from western science and cannot readily be interpreted out of context. Usually a scientist interested in a particular phenomenon will both pose his question and answer it within a western frame of reference. Such an approach could easily lead to misinterpretation of a story.

(ii) Language There is a serious linguistic problem involved in translation. At the present time, few if any non-Athapaskans other than a handful of linguists have any fluency in northern Athapaskan languages. Consequently we must rely on translations provided by bilingual Athapaskan and English speakers and have no Athapaskan versions against which to evaluate the translations. While I am not qualified to judge the extent to which the meaning of a narrative changes in translation, it does place obvious limitations on anyone without linguistic competence trying to learn traditions.

(iii) Accessibility The limitation most frequently cited by scientists is accessibility to oral tradition. There is understandable reluctance on the part of Native people to discuss traditions unless there is some clear reason for doing so. First there is fear of ridicule which is the most common response of outsiders to traditions they don't understand. Secondly, in some parts of the north (especially on the north-west Pacific coast of North America) traditions are considered personal property and can only be told by the owner. There is a whole area of ethics here which is being redefined by Indian communities

who want to ensure that traditions are recorded but not misused.

(iv) Literary Style Each culture has a special literary style which cannot be ignored in analysis of oral narrative. Narrative style, literary structure, and repeated themes or motifs must be understood before it is possible to extract aspects useful to science. Like all literature, oral literature may seek to transform rather than accurately reflect life, and this poses a problem for someone trying to isolate historical data (see McClellan 1970b).

(v) Symbolism Similarly, a subject in any story may be treated by allusion, figurative or symbolic languages (Algoa 1968, p.235). In some of the discussion below, for example, stories about giant worms (gu') may be interpreted as describing extinct animals (Harington 1970), surging glaciers (Workman 1978, p.60) or thawing permafrost (De Laguna 1969-70, p.19).

(vi) Time perspective One of the most serious limitations for scientists is the handling of time in oral narrative. Vansina, a student of African tradition, points out that most oral traditions do not contain even internal sequence of time and would be undatable and unusable if other supporting evidence were not available (Vansina 1971, p.461). For example, 'telescoping' of events is common in all oral literature; events occurring over several generations may be condensed into a single generation. In the Yukon, McClellan noted that Athapaskans have high tolerance for discontinuity in time so that 'long ago stories' which took place when animals and men could freely communicate can co-exist with events in the present or recent past (McClellan 1970b, p.116). This can be most bewildering to a western listener.

Scientists, then, should not expect oral cultures to handle concepts of time in the same way that they do; this limits any possibility of being able to date scientific phenomena on the basis of Native traditions.

(vii) Space Ideas of spatial relationship are similarly unfamiliar in oral traditions. A tradition may refer to a 'universe' which is really quite small (Vansina 1971, p.461). In the Yukon, Indians rarely stress spatial relatedness of a series of events in their traditions. Henderson (1978) documents how Indian concepts of spatial organization change under the pressure of culture change to give new spatial dimensions to old stories.

(viii) Quantitative data Native traditions in north-western Canada do not handle quantitative data in the same manner as western science. People may speak of 'hundreds' or 'thousands' of people, years, moose, or ptarmigan when they merely mean 'many'. Vansina considers this to be true for oral traditions generally, noting that quantitative data tends to be a 'blind spot' in oral tradition (Vansina 1971, p.459).

(ix) Deliberate distortion Finally, there are clearly problems which can arise from deliberate distortion - plagiarism, contamination from other sources, fabrication, mixing of traditions. Television may contribute to this kind of problem.

In summary, then, oral tradition tends to be timeless rather than chronological, to refer to situations rather than events. Oral tradition has a specificity of its own which puts limitations on its use. A single tradition cannot be used by itself but only in combination with other sources, in comparative

ways (Vansina 1968, p.97-98; 1971, p.443).

### II.3 Scientific Tradition

#### (a) The Context of Northern Science

While it is possible to isolate some of the essential characteristics of oral tradition, it is more difficult to say concisely what we mean by scientific tradition. Scientific theories and scientific disciplines have changed radically even in this century. Furthermore there are still fundamental debates in the philosophy of science about what it is that scientists actually do (see Popper 1959; Kuhn 1962; Lakatos and Musgrave 1970).

Classical science in the seventeenth, eighteenth and nineteenth centuries was based on Descartes' and Hobbes' notions that cause was unalterably linked with effect, on Bacon's idea that induction was the intellectual basis of science, and on Newton's assumption that scientists could observe matter without actually affecting its motion. Implicit in science was a model which assumed that nature was causal and continuous - a self-contained independent system.

By the end of the last century it was clear that the classical model did not work: the behaviour of light was anomalous; the orbit of Mercury did not keep time; radioactivity and the behaviour of electrons could not be explained by the classical models (Bronowski 1969, p.16-19). These problems generated an unparalleled growth of new concepts, theories and branches of science. Charles Darwin's work gave a whole new perspective to natural history. Einstein's principle of relativity made

scientists revise their traditional idea that time is the same for everyone everywhere, and bound it to the observer's passage through space. Research in quantum physics showed that causality was not a necessary formulation for the laws of nature (Bronowski 1969, pp.32, 40). Statistical techniques enabled scientists to discuss nature not as a mechanism but as an algebra. Rather than continuing to impose man-made scientific laws or logic on nature, or hoping that the error of the classical model was small and could be corrected by some minor compromise, scientists began to try to understand nature on its own terms.

In the present decade, science is concerned less with 'events' than with relations, structures, shapes and most of all with process.

Science is experiment; science is trying things. It is trying each possible alternative in turn, intelligently and systematically; and throwing away what won't work, and accepting what will, no matter how it goes against our prejudices. And what works adds one more piece to the slow, laborious but triumphant understanding of our world (Bronowski, 1977, p.2).

A scientific procedure, then, is seen as breaking down nature's code to constituent symbols and their laws of arrangement. Scientists, like everyone else, are limited by their own concepts and their own framework; however, this decoding approach does link sciences like physics and biology with what Bronowski calls "those interlocking puzzle sciences" like geology, paleontology and archaeology (Bronowski 1977, p.53).

Given this background, the part played by Arctic and sub-Arctic scientific research becomes clearer. It is generally acknowledged that research in polar regions has had specific

benefits for specific physical sciences because the observations recorded there are of a kind available no-where else. Detailed meteorological observations made in polar regions have contributed to our understanding of global atmospheric circulation. The relative simplicity of the ecological systems in polar regions contributes to model building in the life sciences. Studies of glaciers in polar regions have provided the basis for much of the science of glaciology.

If a scientist becomes interested in oral tradition, he usually has a particular phenomenon in mind. He might be interested in traditions which could help him enlarge a working hypothesis. He might see narrative as a source of data. He might hope that traditions could be a source of validation or verification if other data are uncertain. But these possibilities are all based on the conventional western supposition that science is the 'superior' model of explanation and that oral tradition is useful only to the extent that it can confirm views put forward by scientists. It is conceivable that native frameworks or classification systems could cause a scientist to re-evaluate his own framework for viewing a particular phenomenon.

(b) Limitations of Western Science

If oral tradition is bound by its own cultural context, so is science. When he was working with Gwich'in informants at Old Crow in the northern Yukon, biologist Lawrence Irving concluded that scientists utilize an impoverished framework compared with Native informants who have a manifestly richer view of their natural world.



Modern science and technology rely so much on the printed word that it is difficult for us to communicate accurately with people whose only record of knowledge consist of the remembered meaning of spoken words ... To those like myself, who are not familiar with unwritten languages, it is surprising to learn that a complete category of natural objects, for example birds, can be accurately named without the aid of a record in book or museum. The transmission of names of objects through memory appears to be more conservative than their preservation in writing or the taxonomy of science, for the latter two processes are provisional, whereas memorized naming is definite. Upon reflection it is evident that the use of names in the transmission of knowledge by speech must be completely conservative or the result would be utter confusion (Irving 1958, pp.117, 119).

Hugh Brody cites examples of detailed environmental information provided by Inuit hunters who have spent their lives on the land while arguing that western scientists are ill-equipped to understand such information because their frameworks for viewing ecology are narrow:

The Inuit of Baffin Island have detailed knowledge of such (ecological) changes for every species ... To organize such ideas in accordance with southern ideas of ecological systems would involve removing them from their context - a context that ignores many of the distinctions that are fundamental to science - and destroy at least one of the focal meanings of these details (Brody 1976, p.216).

An observation made in north-western Alaska is familiar in the Yukon. Ecologically minded anthropologists have argued that physical environmental constraints have significantly influenced traditional land use and settlement history. An anthropologist working there in 1969-70 attempted to reconstruct demographic and social patterns in the mid-nineteenth century. Much of the research involved studying topographic maps with men from that area, many of whom were "literate, Americanized,



well travelled and adherents of Christianity". Nevertheless, their description of land use gave a central place to a range of non-empirical phenomena.

Very early in my investigation ... it became apparent that the non-human environment as I perceived it constituted only a portion of the external conditions which influenced traditional Eskimo settlement patterns ... As the cases accumulated, it became increasingly obvious that to account fully for the location and distribution of traditional settlements solely in terms of environmental factors that I could perceive would be impossible (Burch 1971, p.149).

Despite the difficulties involved, it is worthwhile to pursue the comparison of such diverse frameworks with a view to learning something from the framework rather than just from specific pieces of information. This view is central to much of the recent thinking in philosophy of science:

The central point is that a critical discussion and comparison of ideas is always possible. It is just a dogma - a dangerous dogma - that the different frameworks are like mutually untranslatable languages. The fact is that even totally different languages like English and Hopi or Chinese are not untranslatable ... The difficulty of discussion between people brought up in different frameworks is to be admitted. But nothing is more fruitful than just such discussion; than the culture clash which has stimulated some of the greatest intellectual revolutions (Popper 1970, p.56-57).

To this one might add the qualifier that such discussion can only be fruitful when the western scientist is able to detach himself from his own framework and to try to understand the Native framework with the same seriousness with which he would treat his own.

In the following sections, I will consider specific traditions and specific areas of scientific research in the Yukon to see how the two might complement one another.

### SÉCTION III

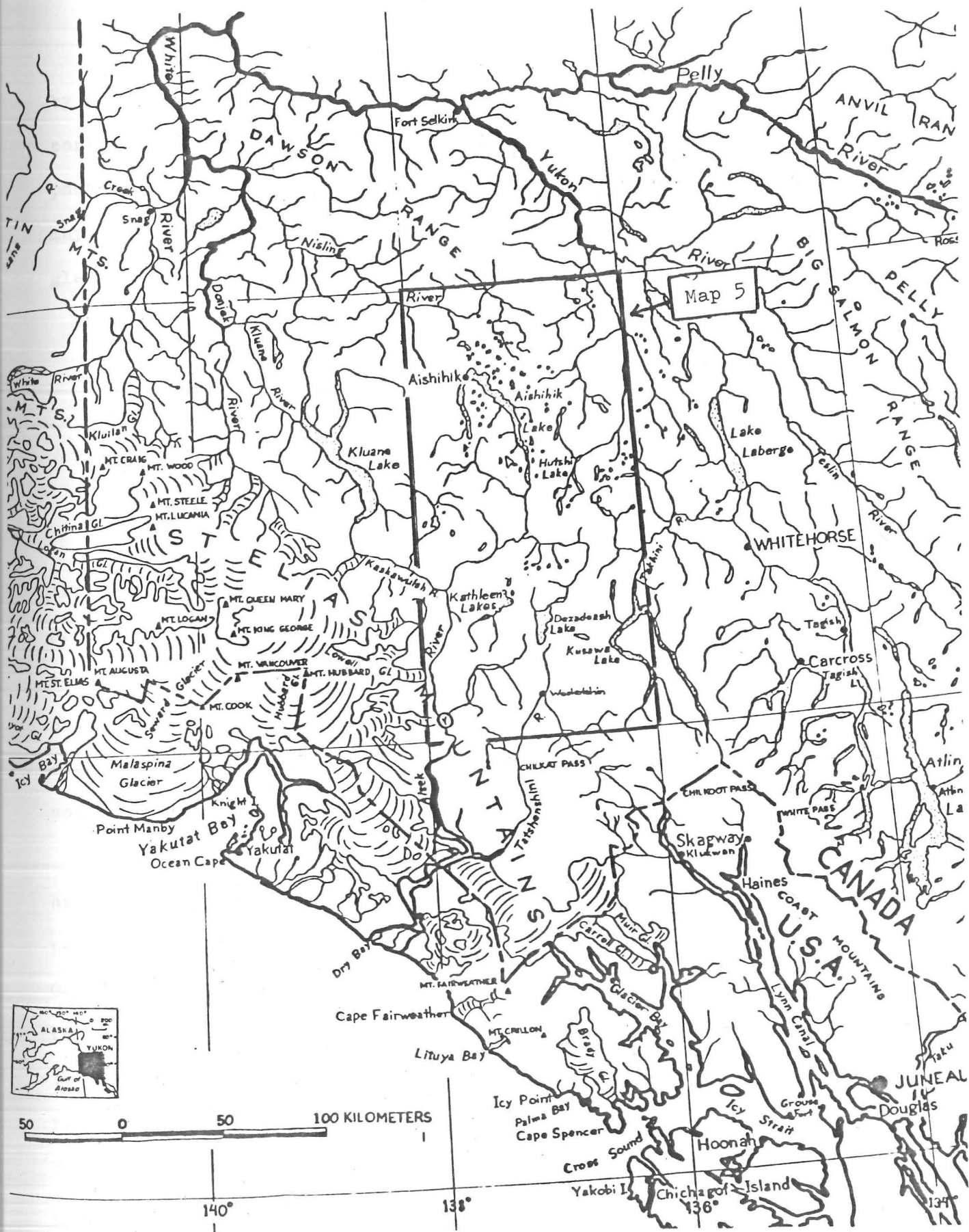
#### CONVERGENCE OF ORAL AND SCIENTIFIC TRADITIONS

This section considers specific examples of how the two traditions, oral and scientific, interpret particular aspects of the natural environment. It begins with oral traditions relating to glacier movement and impounded lakes, fluctuations in climate, detailed knowledge of topography, minerals, prehistory, fauna and flora and relates them to present day scientific research in the central and southern Yukon Territory (see Map 3, p.30). A serious shortcoming with this approach must be repeated. It extracts references embedded in more general traditions, looks at them through a veil of western categories (geology, archaeology, biology), evaluates traditions as 'evidence' to be accepted or rejected by science and does not do justice to the traditions themselves. However, historians and scientists are using traditions and the aim of this paper is to evaluate the extent to which this approach is legitimate.

#### III.1 Glacier Movement and Impounded Lakes

##### (a) Oral Data

One of the most universal oral traditions is that of the Deluge, a great flood which covered the earth and from which only a handful of survivors escaped (Thompson 1932, section A1010, A1020-22). Yukon Indians have this tradition and can point to mountain tops where remnants of a raft are said to be visible. A geologist who has examined this narrative in various parts of the world points out that no universal flood could have occurred



Map 3

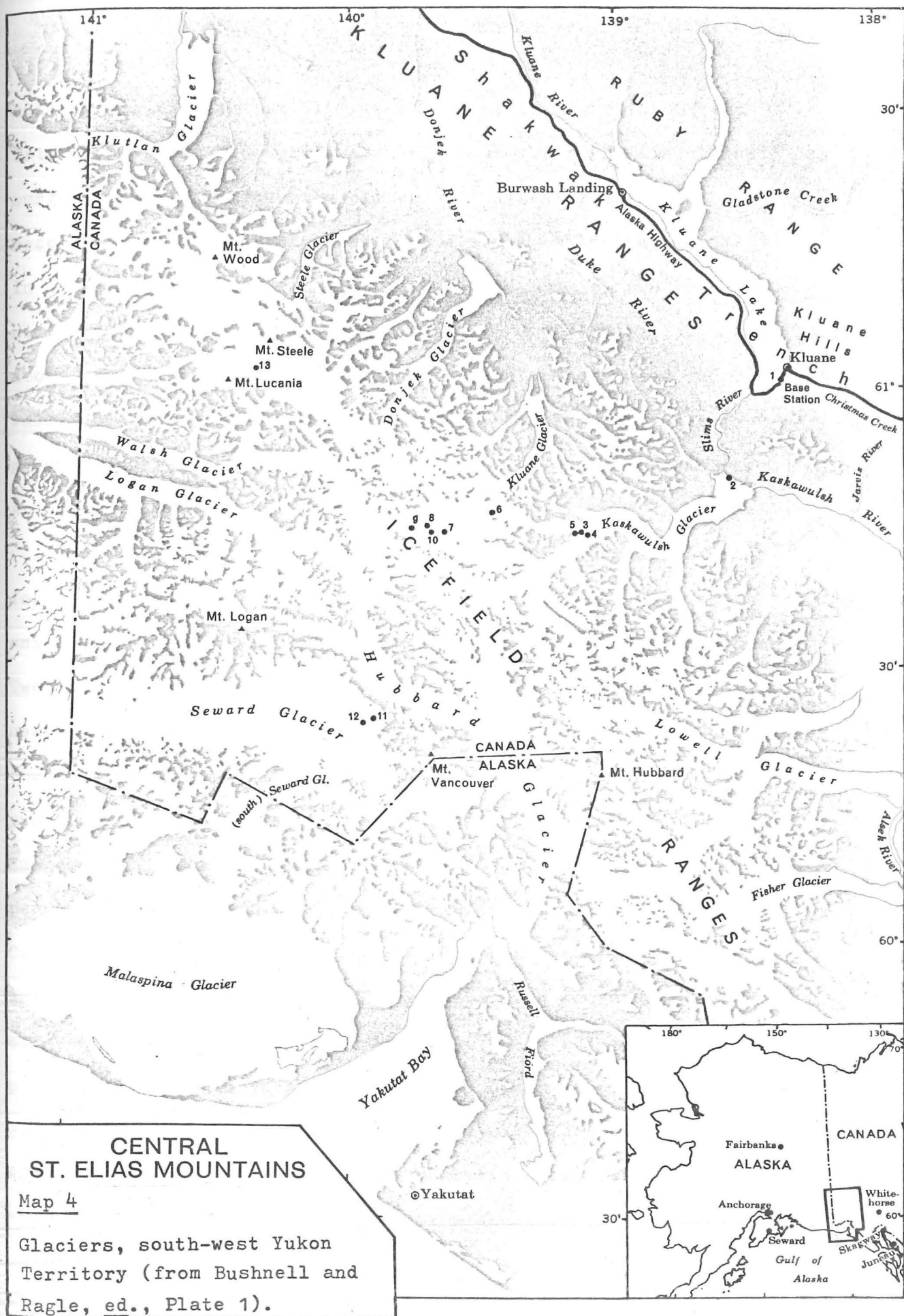
The research area: south-west Yukon Territory and Gulf Coast of Alaska. (After De Laguna 1972, Map 2).

by normal geological processes because the amount of water on earth is constant. However floods, plural, are a universal phenomenon and she suggests the hypothesis that Deluge traditions may be related to glacier-dammed lakes which followed the last glaciation.

The number of smaller lakes that were impounded temporarily by tongues of ice is impossible to estimate, but there must have been thousands of them at different times and at different locations. When ice dams impounding such lakes fail, they often must have failed suddenly, and there must have been many local floods which could have wiped out Indian villages downstream ... (Vitaliano 1973, p.145).

In this context it is worth considering some narratives from the south-west Yukon Territory. The glaciers in the St Elias Mountains, collectively known as the Icefield ranges are active remnants of the Wisconsin glaciation. The interval which scientists refer to as the Neoglaciation culminated in the mid-eighteenth century and these glaciers have surged in recent if not living memory (see Map 4, p.32).

The Lowell Glacier is known by the Athapaskan name Naludi' or 'fish stop' because its movement across the Alsek River has periodically stopped the migration of salmon from the Pacific Ocean to the lakes and tributaries of the upper Alsek. According to a tradition told to me by a woman born in 1892, this surge first took place when a young boy from the Tlingit village of Yakutat (at the mouth of the Alsek) visited the Yukon and made fun of an Athapaskan shaman because of his balding head. To punish him and his Tlingit tribe the shaman caused the glacier to surge across the river and a huge lake formed behind the dam. Then the shaman broke the dam and the water swept downriver





killing all the Yakutat Tlingit camped at the junction of the Tatshenshini and Alsek Rivers. That was the first time Nałudi' surged, but it subsequently blocked the Alsek several times, most recently when the narrator was just a small child (before 1890) in her 'grandmother's time'. That summer some people travelled north to Kluane Lake and others stayed to dry meat on the mountains above present day Haines Junction. The glacier surged and the valley basin flooded in just a few days, killing hundreds of ground squirrels, then drained out quickly as the dam broke (see Appendix, p.1a).

In discussing this further, she identified a specific cause for recent surges. Glaciers are described as dens of giant animals, some of whom emerge intermittently to terrorize people. Two stories concern a pair of giant owls who inhabited a glacier near Dalton Post; when they were finally killed by human beings, the glacier melted. Others talk of giant snakes. There is a prohibition against frying food near glaciers because if the giant snakes smell grease, they emerge radiating heat so intense that people are driven away and any meat left behind is cooked. Consequently people always boil rather than fry food when they are camping near glaciers, and any infraction causes a glacial surge (Appendix, p.1f). Glaciers which have surged under such provocation include Dadžik (Donjek) and Tänshi' (Kaskawulsh) glaciers as well as Nałudi' (Appendix, p.2a; see Map 4, p.32). Another story to which structural analysis could be readily applied in a more formal analysis of myth explores the relationship between raw and cooked food and glacial surges (Appendix, p.3a). To be fully understood, these traditions would have to

be seen in the context of Athapaskan mythology; however, these examples illustrate the nature of the narrative.

A search of the literature reveals related traditions in the same area.

Working on the Pacific coast, at Yakutat, Frederica de Laguna recorded a story about a great flood which swept away a village at the junction of the Tatshenshini and Alsek rivers in 1852 (De Laguna 1972, p.276). Another tradition at Yakutat Bay refers to breakage of a glacier across the Alsek toward the end of the century. Before this, water reportedly flowed under the glacier; Tlingit from Dry Bay travelled upriver to trade by an overland portage and paddled downstream under the ice. The collapse of that tunnel is said to have caused a flood at Dry Bay (De Laguna and others 1964, p.17). She compares this with reports from the headwaters of the Alsek heard by archaeologists Johnson and Raup and anthropologist McClellan in the 1940's (Johnson and Raup 1964, p.34; McClellan 1975, p.72).

Oral traditions about glaciers are interwoven with stories of Tlingit-Athapaskan trade. There are particular references to the dangers of glacier travel. Two stories I recorded revolve around the disappearance and rescue of men who fell into crevasses. One woman told how her Tagish father rescued his Tlingit trading partner from certain death; another described the experience from the perspective of the victim and gives supernatural explanations for his survival (Appendix, p.4a). There is documentary evidence that some Indians crossed dangerous expanses of glacier to trade (Seton-Karr 1891, p.80; De Laguna 1972, p.81). When whites tried to follow their example, they found



the experience terrifying (De Laguna 1972, p.86).

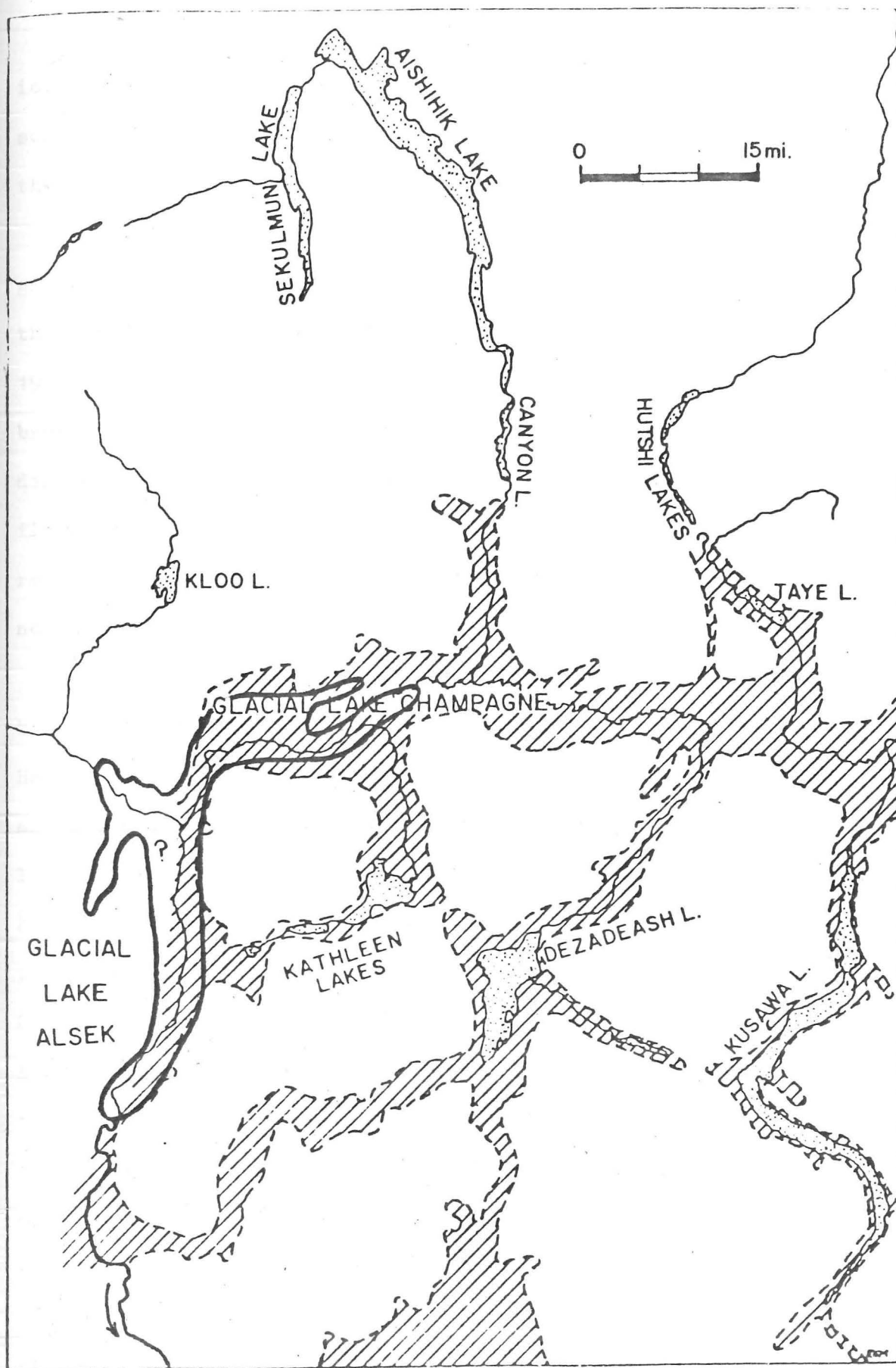
(b) Scientific Data

Most of these traditions refer to the north-eastern flanks of the St Elias Mountains which rise to peaks of 5800 metres and separate the Yukon interior from the Pacific ocean. In the interior they drop gradually to the Shakwak trench, a 300-km long valley filled with lakes and floored with glacial deposits (McConnell 1904, p.15). This valley supports the present day human habitation in the area.

Following the Wisconsin glaciation, drainage of this valley to the Pacific was blocked periodically as glacier-dammed lakes formed.

(i) Glacial Lake Champagne The first and largest of these was Glacial Lake Champagne which formed following the initial retreat of glaciers about 12,500 years ago. This immense lake filled the Shakwak Valley and all adjoining valleys (see Map 5, p.36). Best estimates are that it drained some time between 9,000 B.P. and 7,100 B.P. and that human beings then moved into the newly drained basins (Workman 1978, p.32-34). Well developed shorelines can still be seen at 701 metres, 853 metres and 914 metres above sea level (Kindle 1953, p.15-16). It coincided with the formation of other nearby lakes, now extinct: Glacial Lake Jo Jo, Glacial Lake Kloo, Glacial Lake Fisher. Together with the lakes which followed, these lakes may be at the basis of a very ancient Deluge tradition.


(ii) Glacial Lake Alsek This lake, also called Recent Lake Alsek in the literature, was the largest ice-dammed lake to form in western North America after the retreat of the Cordillera



Map 5

Maximum extent of Glacial Lake Champagne and Glacial Lake Alsek  
(After Workman 1978, Fig.6 and Fig.9).

Glacial Lake Champagne 

Glacial Lake Alsek 

ice sheet (see Map 5, p.36). It formed when the Lowell Glacier surged, blocking the Alsek at Goatherd Mountain. At its maximum, the ice built up to a height of 200 metres (Clague 1979b, p.63).

Early studies by a geologist and a team composed of archaeologists, botanists and geologists in the 1940's concluded that there must have been more than one filling of this lake (Kindle 1953, p.21; Johnson and Raup 1964, p.63). When the ice dam broke in the 1850's, the lake drained in one or two days, discharging its water through the Alsek valley in an enormous flow, comparable to that of the Amazon River (Clarke, unpublished report). Traditions reported above by De Laguna and in my own notes are most certainly related to this lake.

Clague's recent assessment suggests that there may have been at least five fillings during the last five hundred years. He documents heights and ages of each lake using such evidence as wave cut beaches, driftwood, breaks in density and size of lichens, the fact that the oldest trees in the valley are only 80 years old, and the discovery of a crudely-hewn driftwood paddle, shaped with a metal tool, at an elevation of 561 metres, 28 metres above the Alsek River and 21 km north-east of the Lowell glacier (Clague 1979b, p.65). His evidence also suggests that the lake drained extremely rapidly.

Glaciologist Gary Clarke is presently preparing a manuscript on this subject and estimates that there may have been even more fillings. It is known that the lake rose to 595 metres in the 1850's and that there were definitely no more recent fillings that brought the water higher than this, but it is possible that there were one or more fillings after 1850 which could have raised

the water to levels below 595 metres. Consequently, eye witness reports of Lake Alsek are of considerable interest to scientists (Clarke, personal communication).

In other parts of the world, for example Norway, written records are available to assist scientific observations of similar phenomena (see Liestøl 1955-6); no such records are available for this period in the Yukon.

(iii) Donjek, Kaskawulsh and Steele Glaciers There are also traditions about the glaciers Tänshi' (Kaskawulsh) and Dadzik (Donjek). A team of geologists from Yale University estimates that the Donjek reached its terminus in 1825 and then began to retreat, and that the Kaskawulsh began to retreat by 1865 (Denton and Stuiver 1966, pp.587, 590). Two other geologists state that the Kaskawulsh was in its terminal position as recently as 145 years ago, retreated and stopped in 1870, and retreated and stopped again by 1939 (Borns and Goldthwait 1966, p.600).

In 1935, geologist Walter Wood led an expedition to the Steele Glacier (another surging glacier) and reported that local Indians would not accompany him there because they were afraid of "annihilation from floodwaters and crashing ice". He also stated that Burwash Indians believed it was no "good to cook with grease" in the Steele Valley, just as in the traditions I recorded (Clarke, personal communication). Given the expansions and retractions of glaciers in the last century, it is not surprising that Indians regarded them as living things or as dens for animals.

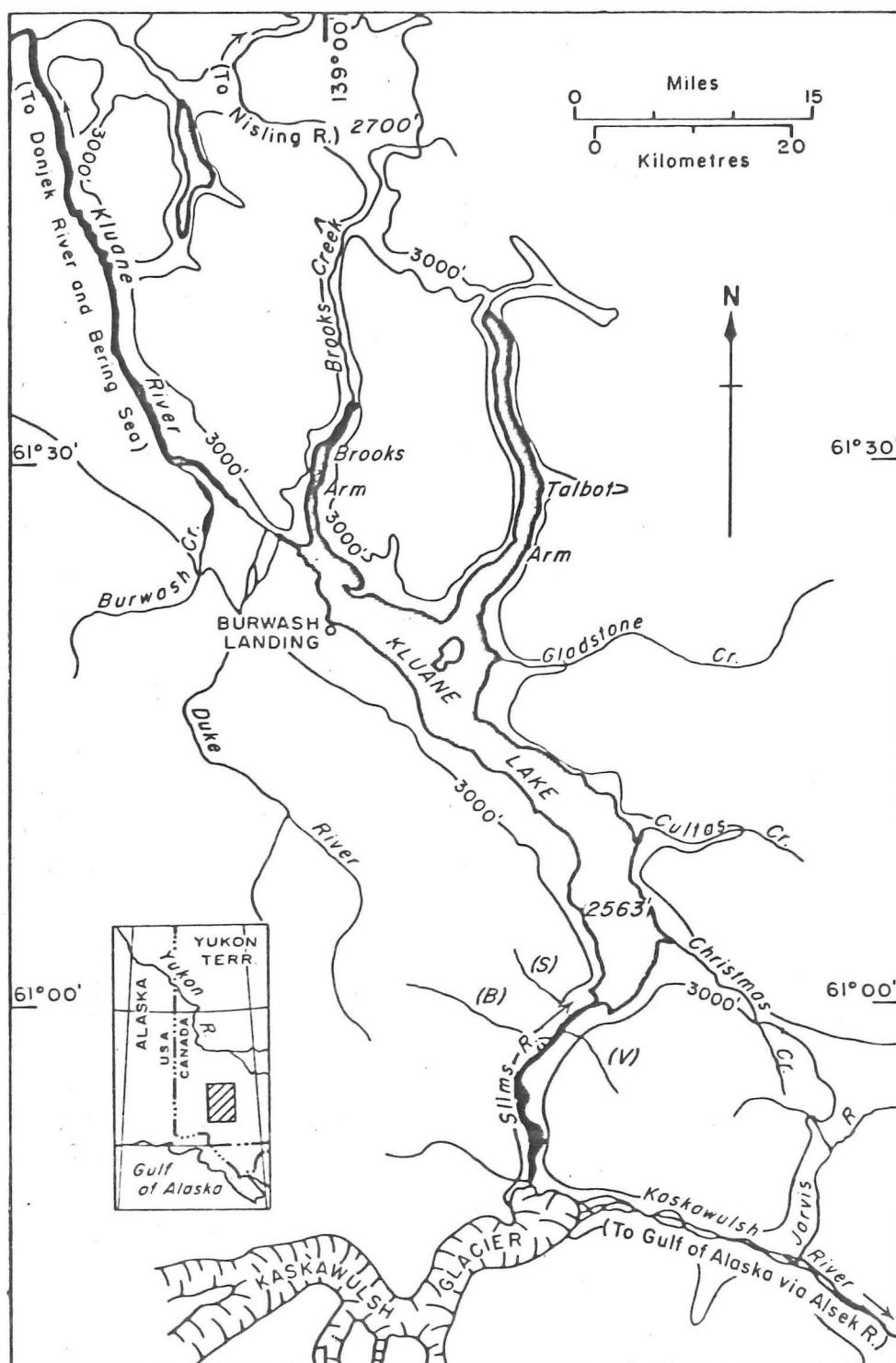
(iv) Kluane Lake A related problem for which I have no oral data so far surrounds Kluane Lake. The drainage of

this lake has long been a controversial issue for geologists and archaeologists (see Bostock 1952; Johnson and Raup 1964, p.26-28; Bostock 1969). Recent evidence suggests that the normal drainage for Kluane Lake was once to the Pacific via the Alsek River (see Map 6, p.40). The pattern was maintained until the Kaskawulsh Glacier advanced some four hundred years ago during the 'Neoglaciation', blocking the Alsek River and thereby raising Kluane Lake to some higher level. The lake's waters then cut a new channel to the north-west and presently maintain that drainage; however, with continued retreat of the Kaskawulsh the Alsek might well 'recapture' the lake (Bostock 1969, p.17).

The reversal of this lake must have had a significant impact on human occupants. It is reasonable to assume that there could be very old traditions about Kluane Lake, because unimpeded access of Kluane to the Pacific would surely have meant a salmon run to that lake. Unfortunately the high present levels prevent archaeological work along the older lower shoreline.

(v) Scientific Confirmation of Oral Traditions Some of the most significant independent confirmation of oral tradition comes from Yakutat Bay, at the mouth of the Alsek River (see Map 3, p.30). De Laguna reports Tlingit traditions which may date from 1400 A.D. telling how Yakutat Bay and Icy Bay were filled by ice while people hunted on ice-free coasts to the east and west. Another tradition refers to a village on the west shore of Icy Bay which was overwhelmed by ice during the Neoglaciation. The name 'Yakutat' means "a lagoon (or bay) is already forming" in Eyak, an extinct Athapaskan language.

These traditions are confirmed by archaeological and geological



Map 6

Drainage routes in the area of Kluane Lake, Yukon Territory  
(After Bostock 1969, Fig.1).

evidence, radio-carbon dates and tree ring dates. Lobes of the Maláspina Glacier once filled Icy Bay and Yakutat Bay, then began to retreat by 1400 A.D. to positions near or behind present limits. Excavation at the village site shows that it was established soon after this date, before trees began to grow; during the Neoglaciation in the 18th century ice filled both bays again (De Laguna 1958).

A full range of traditions associated with glacier movement could give us a clearer picture of the impact of the Neoglaciation on human inhabitants of this region.

### III.2 Climate

#### (a) Oral data

Older men and women in the central and southern Yukon tell of a terrible year sometime during the last century when "two winters joined together" and there was no real summer. The imagery in the stories conveys some of the hardship. Young moose were stillborn in spring and froze to the ground. Lakes froze to the bottom and men had to chisel deep into the ice, digging up frozen fish. The snow was not deep, but it formed a hard crust so that people could not see animal tracks. People ate snow in desperation and died. Women gathered stoneberries for soup. Men were so weak that they could scarcely hunt and when they did kill game they were too weak to carry it home. There were rumours of cannibalism. According to one older woman "bodies of children were stacked like cordwood" (see Appendix, p.5a).

It is difficult to locate this summer in chronological time,



bearing in mind the different manner in which oral tradition handles chronology. Two women who discussed the story in detail propose that it occurred when their parents were small children (about 1875); however, anthropologist Catharine McClellan heard similar stories in the 1940's and estimated then that they referred to the middle of last century or earlier (personal communication).

(b) Scientific data

Arctic and sub-Arctic temperature records date only from 1930 in most parts of the Canadian Arctic (Barry and others 1977, p.201) and from slightly before the turn of the century in Alaska (Hamilton 1965, p.106). Hudson's Bay Records are available only for two locations in the southern Yukon, Fort Pelly Banks and Fort Selkirk, and then only sporadically between 1840 and 1852. My research at the Hudson's Bay Archives suggests that there were unusually cold summers in the mid-1840's; however, without comparative data for other years, this can only be impressionistic at this time.

Considerable evidence from temperate parts of North America and Europe suggests that the summer of 1816 - the year after the volcanic eruption of Tamboro - was exceptionally cold. Records from Connecticut, southern England and Switzerland show that it was the coldest year for which records exist. While there are no comparable records for Canada, evidence is cited that:

The cold was still more severe in Canada. The small lakes to the north of Baie St. Paul on the St. Lawrence River were still covered with ice in the middle of July. In Canada even wheat, which along with other grains except corn had done well in the United States, perished (Strommel and Strommel 1979, p.137).

At higher latitudes, the impact of volcanic dust could have been even more extreme. The idea that dust in the upper atmosphere can result in lower temperatures on the ground has been confirmed through long records of temperature and fairly complete records of volcanic eruptions from many parts of the world. However, this date may be too early to account for the Yukon tradition about the year summer did not come.

A dendro-climatologist at Columbia University is currently reconstructing June-July temperatures for the northern Yukon based on tree ring chronologies dating back to 1550. These are taken from a station on the upper Peel River, considerably north of the research area. He estimates that in the 19th century the lowest tree ring growth at this station occurred in 1845, 1849, 1850 and that this low growth period in the 1840's occurs in other chronologies in the Canadian north (Jacoby, personal communication). Interestingly, La March and Fritt show frost damaged tree rings in the Swiss Alps for similar years: 1835, 1841, 1847 (La March and Fritt 1971). Jacoby's 1840's data seems consistent with information in the Hudson's Bay records which I have seen, but the suggestion that it is the time of the story is contradicted by Blasing and Fritts' reconstructions, also based on tree ring data. They show that while the northern Yukon was extremely cold between 1837 and 1851, the southern Yukon, where the story is told, was warmer than usual (see Blasing and Fritts 1975, map on page 54).

Jacoby also suggests that for the second half of the 19th century, 1887 was the coldest year in the northern Yukon; however, a Geological Survey of Canada party travelled to the

upper Yukon River in 1887, and their recorded descriptions of that summer do not indicate undue hardship (Dawson 1898). Temperature records for northern Yukon may not tell us a great deal about conditions further south. In this case we clearly need both more versions of this narrative with attempts to tie it to specific genealogies, and also more climatic and ecological data.

### III.3 Cartography, Geology, Landforms

Indian traditions about what we call landscape, landforms and geology are of interest to a student of oral history at two levels. First, they can be seen as a source of 'objective' knowledge of a kind valued by western science. Early traders, geologists, prospectors and travellers all depended on this detailed knowledge of when and how to travel. The same kinds of observations have contributed significantly to primary knowledge of minerals in the Yukon. Indian observations were invaluable in the history of northern mapping before the development of aerial photography.

Secondly, Indian observations are a rich source of etiological literature explaining origins of specific landforms in what non-Indians would call symbolic terms. These latter traditions provide a window on perception, giving a totally different, non-western view of the natural environment. In oral tradition 'symbolic' and 'objective' aspects are interlocked and any separation comes only via western analytical procedures. Indian accounts of the initial discovery of gold which touched off the Klondike gold rush, for example, include a strong supernatural

element. The original claim was staked (pegged) by a Tagish Indian, Skookum Jim, but tradition explains his good fortune as attributable to the assistance of his Frog Helper and also to the fact that he heard Klenähidäk, or Good Luck Lady<sup>2</sup> (see also McClellan 1963).

My own data about mapping are relatively limited, probably because women were less involved in exploratory travel than were male hunters. Women's descriptions of journeys emphasize events tied to locations rather than locations themselves; for example, descriptions of annual travel are filled with information about who was born, who became ill, who died as they travelled. Similarly, on Southampton Island Edmund Carpenter found that Inuit hunters drew detailed accurate maps of their physical environment while women's equally accurate maps were location maps, made up of points each indicating a settlement or trading post (Carpenter and others 1959, p.5-6).

In this section, I rely more on secondary sources; again, examples are taken primarily from the south-west Yukon.

(a) Cartography

Until the late 1880's, the coastal Tlingit monopolized trade with the interior of the Yukon. Their control was not difficult to maintain; they alone knew the location of the three passes from the Pacific coast to the interior and they easily limited access to them.

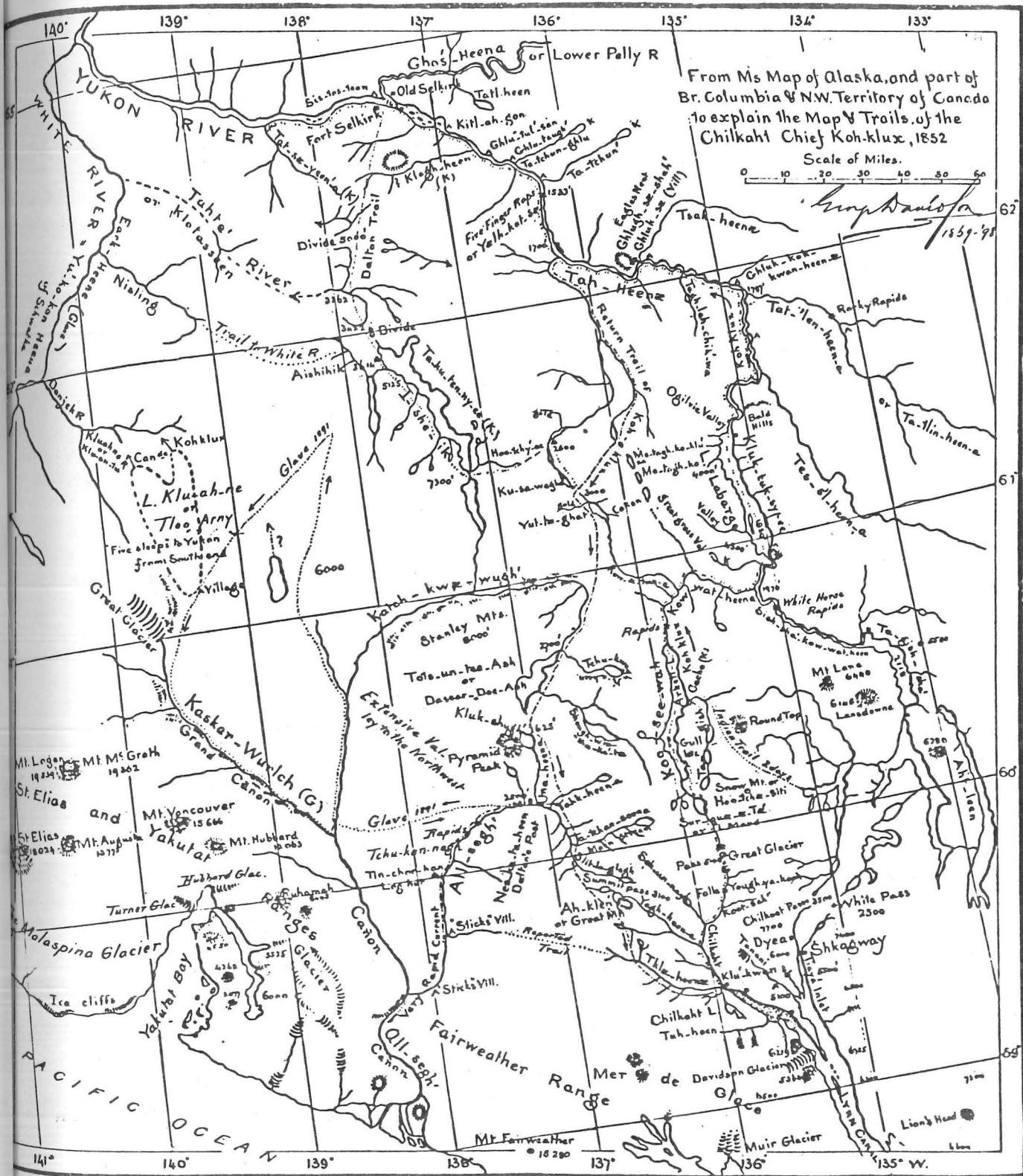
In 1869, an American scientist, George Davidson, travelled to the Alaska panhandle to observe a total eclipse of the sun. While there he prevailed upon a Tlingit chief named Kohklux to draw a map of the region beyond the mountains. This same chief

had led a raiding party of Tlingits to the upper Yukon River in 1852 to loot and drive out the newly-established Hudson's Bay trading post at Fort Selkirk, which appeared to threaten Tlingit hegemony over southern interior trade. Kohklux drew the map and the routes taken by the Tlingits there and back. This first map of what is now the southern Yukon Territory is remarkably accurate and shows locations of villages which were abandoned by the turn of the century. Davidson published the map, with notes, in 1901 (Davidson 1901) (see Map 7, p.47).

The reliance of early travellers on Indian knowledge of the land is well documented in the literature. One of the first visitors, a journalist sponsored by an American newspaper, wrote:

"Throughout my letter I have retained the native names of geographical points wherever I could learn them. In my opinion this should always be studied. The Indian names of the mountains, lakes and rivers are natural land marks for the traveller, whoever he may be; to destroy these by substituting words of a foreign tongue is to destroy the natural guides. You ask for some point and mention its native name; your Indian guide will take you there. Ask for the same place in your substituted English and you will not be understood. Travelling in Alaska has already sufficient difficulties, and they should not be increased by changing all the picturesque Indian names. Another very good reason why these names should be preserved is that some tradition of tribal importance is always connected with them. These people have no written language, but the retention of their native names is an excellent medium through which to learn their history" (Glave, 1890: November 22).

Despite Glave's advice, those who followed him were often more interested in assigning their own names to the mountains, lake, rivers and glaciers they encountered. Sometimes they took Indian names and applied them to other features. Many of the



Map 7

Map after drawing by Tlingit Chief Kohklux, 1869 (Davidson 1901)



new names were incorporated into the first official map of the region prepared by a Canadian government surveyor in 1897 (McArthur 1898). Attempts a few years later by another surveyor, George White-Fraser, to reinstate Indian names were unsuccessful (White-Fraser 1901).

Not surprisingly, Indian place names in this region do reflect certain characteristics of the natural environment. The Indian name for the White River, near the source of native copper, was recorded as Erk-heen-ee meaning 'Copper River' (Glave 1892, p.878). Tinx kayani on the Tatshenshini River, where Tlingit people came for meat and berries means "Kinnikinnik leaves", a common plant in the area (De Laguna 1972, p.87-9). Cawuce tcu is the Southern Tutchone name for Tatshenshini River, meaning 'salmon running water' (McClellan 1975, p.32); Klukshu means "end of the silver salmon" in the same language (McClellan 1975, p.33); Kluane Lake means "big whitefish lake" (McClellan 1975, p.34). Simän' (Mush Lake) means "red paint lake" referring to red ochre found there. The establishment of a National Park in this region has initiated research into the complexity of Athapaskan and Tlingit place names in the region which will provide a much broader understanding of traditional land use in the area.

(b) Geology

Indian reports of minerals are part of the lore of northern prospectors, with good reason. Indian reports of native copper on the White River inspired early expeditions to this remote area (Hayes 1892). In oral tradition, the power of the Copper Chiefs who controlled access to the copper is



repeatedly stressed.

The discovery at Bonanza Creek which led to the Klondike gold rush was made by Skookum Jim. The present Anvil lead-zinc mine grew from a discovery by an Indian man, Joe Ladue. Cassiar asbestos mine at Clinton Creek (now closed) was the result of a discovery by George Wood, a Han Indian.

Other geological resources of interest to Indians were part of tradition: obsidian in the upper Aishihik valley, red ochre on the Nisling and Donjek rivers, flint at several places on Kluane Lake, schist for skin scrapers at various locations (Workman 1978, p.28). All these items were used in trade with the coastal Tlingit (Workman 1978, p.93).

(c) Landforms

Landform lore is richly symbolic and gives the natural world a dimension totally absent from western approaches to 'landscape'. Three rocks on the Stikine River are said to be a woman, her mother and her brothers, turned to stone when the woman violated a taboo. The four mountains surrounding the village of Carcross supported the trampoline which Animal Mother hung when she created animals; the same is said of Three Aces Mountain above the village of Teslin. Specific lakes like Siman (Mush Lake) and Táshal män (Bates Lake) are homes of monsters which either rise up to snatch victims or suck them into a whirlpool (Appendix, p.6a). McClellan reports other southern Yukon lakes known to be the homes of monsters (McClellan 1975, p.183). A drive along an apparently undistinguished section of the Alaska Highway with someone knowledgeable in these traditions reveals a rich new source of geography, a

'mythography' giving the land depth and resonance. Countless examples like these could be mapped with accuracy.

While these traditions may be of little interest to physical scientists, they do give a broader perspective to northern landscape and cultural aspects of land use.

(d) Athapaskan 'cosmos' and western 'landscape'

Research into differing perception of space is of growing interest to cultural geographers (Tuan 1974; Robinson and Petchenik 1976; Henderson 1978). Writing about changing perceptions of landscape, Yi Fu Tuan suggests that in Europe between 1500 and 1700 A.D. the medieval world view of 'cosmos' yielded to a new, more secular conception of nature which we call 'landscape'. With that may be traced changing meanings of such words as 'nature', 'landscape', and 'scenery'. Now they are often used interchangeably, but this has happened at a price:

Nature keeps company with scenery and landscape by ceding most of its semantic domain and the last two words are nearly synonymous through the loss of precision in meaning (Tuan 1974, p.132).

The relationship with western science may seem oblique. Scientists can locate features of landscape precisely with three measurements: latitude, longitude and elevation above sea level. In an area without human populations (such as Antarctica) this may give as much information as can reasonably be expected. In the north where a small population has lived for centuries, the natural environment has historical, social, economic and intellectual dimensions as well as physical aspects.

Ironically, although the population of an area like the

Yukon has grown in recent decades, actual land use and perceptions of land have shrunk through constraints of transportation routes and settlement clusters. Traditional narrative describes a geography unrelated to present day roads. Ongoing linguistic research, place name research, oral history research and land use and occupancy studies may provide additional data about perception of landscape which may be of long-term interest to scientists working in the north.

#### III.4 Fauna and Flora

##### (a) Oral Traditions

Oral traditions involving fauna and flora convey information of two different orders. On one hand, there are the detailed stories central to Athapaskan mythology; at another level there are precise observations about animal and plant life made in all seasons and over generations.

In mythology, the majority of animal stories deal with the underlying relationship between human and animal worlds. Narratives describe symbolic voyages of human beings to animal domains and the reversal of ordinary reality found there. Indirectly these narratives address the uneasy balance between animals and men who must share the world. They are more akin to literature than to science, but scientists must be aware of the underlying narrative patterns in any attempts to evaluate historical reliability or 'objectivity' of a tradition.

Historical observations about flora and fauna and the linguistic classifications used by Athapaskans may have considerable significance for studies in northern ecology. Some of

the ways in which traditions could relate to specific problems in biology are outlined below.

(b) Biology

(i) Faunal history The most important questions facing northern biologists relate to past, present and future interrelationships of man, animals and environment. Palaeontologists and biologists have only incomplete knowledge of changing faunal history in the north because data are only available for relatively short time spans. The contemporary biological model of maximum sustained yield harvesting is proving inadequate as the large number of variables and increased human interference show how inadequate are our attempts to 'manage' the environment.

Research into faunal history has proceeded rapidly in the past decade with cooperation of palaeontologists, archaeologists and other scientists. Sometimes clues come from local Indians who are interested in the research. Palaeontologist C.R. Harington reports that he was led to discover a mammoth cranium and mandible on the Whitestone River (northern Yukon) by an old tradition of monsters in that region. Traditions about monsters may be difficult to disentangle. For a palaeontologist they suggest Pleistocene fossils, but De Laguna has shown how traditions of giant worms near Copper River, Alaska, refer to slumping permafrost on river banks (De Laguna 1969-70, p. 19). Workman links stories of large worm-like burrowing creatures (gu') with dangerous areas, for example surging glaciers, and the traditions I have recorded support this hypothesis.

Although woodland bison are presently unknown in the

Yukon, Khaus (Bison bison athabaskae) is a figure in Yukon myth. The archaeological record confirms the presence of this animal in the southern Yukon, hunted in Holocene times (Workman 1978, p.55-59). The oldest men in the southern Yukon told McClellan in the 1940's that bison had been hunted in the extreme eastern Yukon during the last century (McClellan 1975, p.120).

(ii) Recent faunal changes In modern times, the Yukon provides a habitat for a wide range of mammals. There have been significant fluctuations of game even in the last century and evidence for this comes almost entirely from oral accounts. Moose and caribou, for example, seem to have shifted their habitats. Caribou are now largely confined to the northern Yukon while moose are the major mammal in the southern Yukon; in the mid-nineteenth century, there were no moose in the southern Yukon. Biologists are not sure of the reasons for appearance and disappearance of these animals.

Two sub-species of Barren Ground Caribou formerly ranged in the southern Yukon - the large herds of Stone Caribou (Rangifer arcticus stonei) and the less gregarious Osborn Caribou (Rangifer arcticus osborni). Herds of Stone Caribou have been seen in historic times around Whitehorse, Carcross (short for "Caribou Crossing"), Kluane Lake, and near the upper reaches of the Alsek River. Indian tradition describes them as blackening the ice at Kluane Lake and Aishihik Lake and this is confirmed in the archaeological record though they have not been seen there in recent memory (Workman 1978, p.16; McClellan 1975, p.108). These caribou have presumably been absorbed into the more northern Yukon herd, but their virtual disappearance makes oral accounts

particularly provocative.

Moose, on the other hand, were extremely rare in the southern Yukon during most of the 19th century, though their appearance in the archaeological record and in at least two Tagish myths which I have recorded indicates that this was a temporary fluctuation. In the south-eastern Yukon, older men reported that when moose disappeared, men forgot how to hunt them and had to learn again when they returned almost a century later (Honigmann 1954, p.15). Earlier reports also confirm this; writing in 1896, Warburton Pike reported:

"Twenty-five years ago there were very few moose along the Liard and the animal was unknown to Indians hunting westward of Dease Lake ... Today the little known region drained by the Dease, the Upper Liard, the Frances and the Pelly is probably the best moose country in the continent of North America" (Pike 1896, p.89-90).

In 1911, anthropologist G.T. Emmons wrote:

"The history of the occurrence of moose in this section can not well be accounted for. It is believed to have been a habitant of all this region in early days, but for some unexplained reason the animal entirely disappeared early in 1800, to make its appearance again in 1877, when several were killed in the Dease country" (Emmons 1911, p.77).

Poole Field was a trader on the upper Pelly River from 1903 until 1913. He was told by the oldest men that when they were young there were no moose in the region, only caribou. These men had hunted them with bows and arrows, spears, snares, deadfalls and large fenced caribou surrounds which they built collectively (MacNeish 1957, p.52). Yet when the big game hunter Charles Sheldon visited the upper Pelly in 1904 and 1905 he found no traces of caribou and was told by the oldest Indians



that caribou did not range in the Pellys (Sheldon 1911, p.245).

Biologists in the south-west Yukon during the 1940's and 1950's reported that according to local tradition there had been no moose there before the last century (Rand 1945, p.76-79), and that some residents had seen their first moose in 1910 (Cameron 1952, p.183).

(iii) Fish and plants Only indirect evidence is available for the Holocene history of fish in the south-west Yukon and this has been compiled by an archaeologist (Workman 1978, pp,25, 60-61). The damming of the Alsek must have periodically prevented salmon from ascending that river. The presence of land-locked salmon in Kathleen Lake indicates that salmon once ascended the Alsek further than they do today to spawn. Despite evidence that Kluane Lake once drained to the Pacific there are no land-locked salmon known in that lake; however, if they ever did come that far there may be oral tradition to this effect. A full inventory of fish used in the present and past, recorded and classified in Athapaskan languages could provide additional information for fisheries scientists, but that information has not been compiled.

Women's knowledge of plant life is detailed and exact. Nutritional and medicinal values, spiritual properties, value as dyes - all these are regularly included in women's accounts of their lives and in my field notes (see also McClellan 1975, p.223-229). Oral traditions contain suggestions about plant history, for example that spruce blight was introduced into the Yukon up the Alsek River in the mid-nineteenth century (McClellan 1975, p.96). Indians also have traditions about how fire-burning



was used as a technique to extend moose browse, a subject difficult to discuss because of severe penalties for setting fires in this century. Again, an inventory of plants, their classifications and uses recorded in the Athapaskan languages could be valuable. In the Yukon, this kind of research is beginning under the auspices of the Yukon Indian Languages Project.

### III.5 Prehistory

#### (a) Oral Data

A significant number of Yukon traditions concern events which occurred in the last century, often involving aspects of aboriginal trade, travel and warfare. These are stories for which direct documentary information is often lacking, but which are not inconsistent with ethnographic and archaeological data for the period. Such narratives include the 'War at Dezadeash' at which a large number of Dalton Post people were killed by Indians from the north-west, probably over a trade agreement; this war still affects social relationships in the southern Yukon. There are oral traditions about the extensive trade in perishables carried on between Tlingit and Athapaskans for at least a century before whites arrived; such perishables, of course, do not survive in the archaeological record. Clan histories are described in narrative - complex movements of people between the coast and interior and resulting social ties. Tales of the 'coming of the first whites' convey some of the cultural disruptions felt around the turn of the century. Traditions refer to major trading centres like Dalton Post, Hutshi, Aishihik, Wellesley Lake - places scarcely mentioned in

written records because they were not on the travel routes taken by white travellers.

(b) Archaeology

Over the years, the relationship between oral narrative and archaeology has been an ambivalent one. Lowie's influential paper arguing against the reliability of oral tradition (Lowie 1917) strengthened the tendency of early archaeologists to work quite independently of native populations. As the limitations of such isolation became clearer, archaeologists in the next generation began to report scientific confirmation of traditions.

Some of the examples were quite spectacular: Pendergast and Meighan reported Pauite traditions dating from 1150 and Hopi traditions from 1125 which had been confirmed by independent archaeological investigation (Pendergast and Meighan 1959). De Laguna reported a tradition referring to an old Tlingit village established after 1400 and overwhelmed by advancing ice during the Neoglaciation (De Laguna 1958, p.434). More recently, archaeologists have qualified their remarks about reliability with reference to specific traditions in specific cultures.

Yukon archaeology began relatively recently and after inauspicious beginnings some archaeologists have established good relationships with Native populations and have involved them in the research (see especially Johnson and Raup 1964, and Workman 1978 in the southern Yukon).

The fortuitous discovery of an ancient mandible near Old Crow, Yukon, by Gwich'in Indian Peter Lord has led to some of the most significant archaeological research now in progress in North America. The bone which he found was identified by archaeologists

as a 29,000 year old tool, and subsequent investigations have recently pushed the possible date of human occupancy in the region back to 60,000 years. The community of Old Crow is very much involved in early man research taking place in the northern Yukon (Irving 1975, 1976).

The interest of Yukon archaeologists in oral tradition is summed up by Workman: referring specifically to the 19th century trade which dominated Tlingit-Athapaskan relationships, he points out that oral tradition contributes more evidence than does the archaeological record:

It is humbling to realize how much this transforming trade was carried on in perishables and how scanty the archaeological record for it is in view of its documented significance. Almost invariably we will underestimate the volume of trade in the prehistoric record of this area, given the likelihood that much of it was also in perishable items and the incompleteness of our present knowledge of the content of local inventories, which alone can help us recognize trade items. We must adjust for this underestimation and remind ourselves that perhaps the most important consequence of trade is the opportunity it affords for social contacts and diffusion, which leaves only the most indirect archaeological traces (Workman 1978, p.94).

Archaeological research will continue during the next decade together with other interdisciplinary research. Oral tradition will have a part to play in such investigations.

### III.6 Volcanoes

While I have recorded no traditions about volcanic activity in the Yukon, this may be a fruitful area for research in the north. In Alaska, Wilcox reports that more than 250 volcanic eruptions from 39 volcanoes have been reported in less than

200 years, and that many more have passed unobserved (Wilcox 1959, p.400). Some of these may be incorporated into oral traditions; for example, De Laguna mentions that the Atna Indians on the Copper River have traditions about a volcano in the Wrangell Range, but she does not elaborate on these<sup>3</sup> (De Laguna 1969-70, p.19).

Souther reports Tsimshian Indian traditions about relatively recent eruptions of the Aiyansh and Mount Edzidza volcanoes in north-western British Columbia, dated at about 220 B.P.  $\pm$ 130. He also discusses the impact of these eruptions on Tsimshian culture (Souther 1970). Vitaliano gives detailed descriptions of volcanic lore from Iceland associated with Hekla, as well as traditions from other volcanically active parts of the world (Vitaliano 1973, p.104-40).

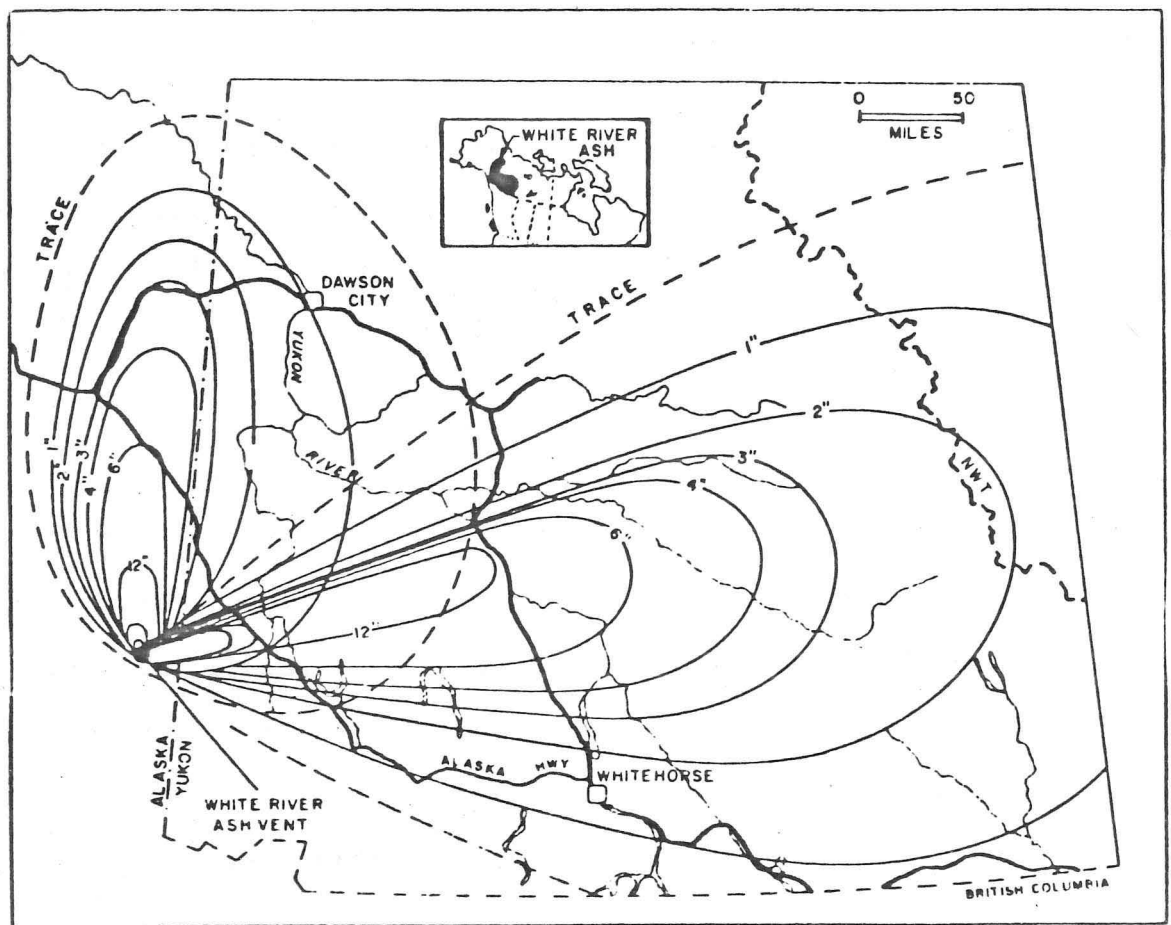
Earliest scientific travellers to the upper Yukon River commented on the widespread layer of volcanic ash deposits they encountered - Schwatka in 1883, Dawson in 1887, Hayes in 1891, Brooks in 1899 (Capps 1916, p.59). Over the years, geologists and archaeologists have tried to reconstruct the date, size and magnitude of the eruption and the distribution of the ash using a variety of techniques (Bostock 1952, Figure 1; Fernald 1962; Johnson and Raup 1964, p.17; Stuiver and others 1964; Lerbekmo and Campbell 1969; Lerbekmo and others 1975). It is of some interest that the only references to oral traditions of volcanoes in this region were reported by Hayes in 1891 when he approached the Klutlan Glacier with Indian guides (Hayes 1892, p.145). The most recent research locates the vent of the volcano under that same glacier.

As mapped, the ash deposit covers 125,000 square miles; the total volume of ejecta is conservatively estimated at six cubic miles (see Map 8, p.61). Evidence suggests that the two lobes were deposited several centuries apart, the most recent information dating the larger east lobe at  $\pm$  700 A.D. or 1300 years ago. While it seems unlikely that traditions of even so enormous an event could last that long, it may be useful to consider Workman's hypothetical reconstructions of its impact on human life (Workman 1973). He suggests that the second lobe was deposited at a time when climate was deteriorating badly (the post-Hypsithermal) and that the likely accompaniment of acid rain, torrential rains or hailstorms, darkness caused by the cloud, noxious fumes such as sulphur dioxide, fluorine and chlorine must have put enormous strains on the human population. The season when the eruption occurred may never be determined, leaving this crucial variable unknown. Nevertheless the long-term chemical effects on animals, fish, vegetation and human populations together with the floods and erosion which must have followed probably rendered the area uninhabitable and must have created a refugee population.

Linguists place the original centre of proto-Athapaskan populations somewhere near the Alaska Yukon border, near the site of the volcano. About 1200 years ago, Athapaskans began to disperse widely. Some moved as far afield as northern California (Pacific Coast Athapaskans) while the Navaho and Apache and Hupa moved to the south-western United States. Linguistically, it is interesting that the far-flung southern Athapaskan languages such as Navaho and Hupa retain considerable affinity

Map 8

Distribution of White River Ash  
(After Workman 1978, Fig.11).





with such northern Athapaskan languages as Sarsi and Chipewyan; in fact there is greater linguistic diversity between longstanding Alaskan neighbours like Koyukon and Kutchin (Krauss 1973, p.904).

Workman makes the hypothesis that the initial movement may have been triggered by this event (Workman 1973, p.253-54). It is unlikely that narratives about this event could have survived so long; however the whole issue of proto-Athapaskan language is the subject of considerable research and may ultimately provide indirect oral evidence about the impact of this eruption on human populations.

### III.7 Earthquakes

Traditions about earthquakes indicate that they were of some concern in the southern Yukon. Narratives describe the earth as a flat plate supported by an old woman who balances it on a pole. When she becomes annoyed, she moves the stick and the earth shakes. While I recorded no traditions about specific earthquakes, this may be because I did not ask.

Plans to build a natural gas pipeline from Prudhoe Bay, Alaska, through Canada to the mid-western United States have initiated research to determine the Quaternary displacement history of the proposed pipeline routes. Studies have been conducted along the northern Yukon and Mackenzie Valley (Stevens and Milne 1974) and along the Shakwak and Dalton segments of the Denali Fault system in the south-west Yukon (Clague 1979a). The Denali Fault is now the focus of greater interest because this appears to be the more likely route in 1979. It is a major intercontinental crustal break which has been active in south

central Alaska. Although there is no evidence of large Holocene displacements in the Yukon, the region is characterized by high seismicity.

Earthquake collection data began in 1899 in the Yukon. Since then there have been at least two high intensity earthquakes in the Shikwak Valley and Kluane Ranges (Clague 1979a, p.177), and several in the northern Yukon and Mackenzie Valley (Stevens and Milne 1974, p.151).

Conceivably, Indian traditions about intensity and duration of earthquakes both prior to and after 1899 could make a contribution to scientific data. Vitaliano provides considerable comparative data about earthquake lore elsewhere in the world, including an example of how Japanese seismologists integrated information from ancient traditions into their research (Vitaliano 1973, p.83-103).

## SECTION IV

### CIRCUM-POLAR RESEARCH IN ORAL TRADITION

#### IV.1 Oral Tradition and Northern Science

The use of oral tradition to reconstruct the past is, of course, not unique to the north. African history, compiled in authoritative volumes by British historians throughout this century has been significantly re-interpreted in the last decade; as oral history has become methodologically more acceptable to historians, a new light has been cast on historical 'truth' (Prins, personal communication).

In this section, I will summarize ways in which oral narrative has been used in other parts of the circum-polar north, particularly as it affects scientific research.

##### (a) Inuit traditions

Inuit traditions are extremely conservative and anthropologists have frequently expressed surprise at the long retention of historical facts in traditional folklore (Boas 1904, p.9). Arima has made an assessment of the reliability of Inuit oral tradition in which he cites such factors as their linguistic conservatism across northern North America, persistence of technology, retention of Inuit names for extinct animals and, most important for assessing historical accuracy, accounts of early explorers' voyages. Narratives describing these visits have been recorded three centuries after the initial visit. He concludes that by conservative estimate Inuit traditions are extremely reliable for fifty years and probably accurate for at least a century (Arima 1976a, p.35-56).

Greenlandic stories and styles of narrative show similar conservatism. Peterson showed consistency of accounts about a migration from Canada to Greenland in the mid-19th century recounted by Inuit from different geographical locations in 1865, 1905 and 1952 (Peterson 1962)<sup>1</sup>. Other accounts stress the importance of local idiom in attempting to interpret tradition (Gilberg 1969-70; Egede 1971). For example, Peary brought six Polar Eskimo from Greenland to Manhattan in 1897. The only one who returned described what he had seen:

People lived up in the air like auks on a cliff. The houses are as big as icebergs on a glacial bank and they stretch inland as far as you can see, like a steep chain of mountains with innumerable canyons that serve as roads ... streetcars as big as houses with masses of glass windows as transparent as fresh-water ice. They raced without dogs to haul them, without smoke, and full of smiling people who had no fear of their fate ... moved by a man pulling a cord ... (Gilberg 1969-70, p.86).

He also spoke of the 'distance shrinker' by which he had been able to converse with Peary in another town without shouting. Even in idiom, this account was too outrageous for Polar Eskimo to accept, and the narrator was nicknamed 'the Big Liar', banished and ultimately killed.

One attempt to link oral tradition with a specific scientific problem in the north revolves around the question of isostatic rebound. During the last glaciation, the earth's surface was depressed; when the load was removed, the land began to rise and the readjustment has been called 'isostatic'. The most dramatic movements have been off the west coast of Norway with a rise of about one metre a year at Bergen and two metres a year at Karmøy Island for the last millenium (Vitaliano 1973, p.28).

The rate of uplift is less in Canada, the greatest amount on the west coast of Hudson's Bay being about one-half metre per century (Bird 1967, p.145).

A geographer, John Spink, has compared accounts of floods recorded by Hall in 1865, Boas in 1888, Nelson in 1889 and Mathiassen in 1933, suggesting that they may be indirect accounts of isostatic rebound. He cites two kinds of reports, 'Deluge' traditions about a great flood covering the earth, and specific accounts about historical changes in the shore-line (Spink 1969a). J.B. Bird is sceptical about the use of traditions which imply that uplift has occurred within man's memory (Bird 1967, p.144-45) but given other evidence of traditions accurately transmitted for a century or more, some accounts may indeed be reliable. On the other hand, it may be rash to attribute a universal tradition, like the Deluge to such a slow geological phenomenon as Spink does. The context of oral tradition must be considered as well as the content.

In related research, Spink has compiled a number of historic Inuit maps of the eastern Arctic, and this kind of work contributes substantially to any studies of perception of landscape (Spink 1969b; Spink and Moodie 1976).

Ethnobotanical work undertaken on St. Lawrence Island provides a useful model for scientific research. It has been argued that Alaskan Eskimo were meat-eaters who paid little attention to vegetable resources. Collaboration by a botanist and anthropologist showed that despite impoverished flora on St. Lawrence Island, Alaska, Eskimo have used at least 17 species for plant food, three for medicines and 10 for fuel. They

conclude with the suggestion that the full extent of the relationship between people and their environment can best be understood by learning how they categorize the flora and fauna in their world (Young and Hall 1969). This kind of research is more typical of work being done with Athapaskan and Algonquian Indians in northern Canada and Alaska, described below.

(b) Northern Indian Traditions

Northern North American Indian traditions are usually considered to be less conservative than Inuit traditions. Research tends instead toward recording of names for animals, plants, fish and other environmental phenomena.

It has long been part of conventional anthropological wisdom that Indians are likely to make detailed classifications of economically important flora and fauna and to ignore the rest. Even Lowie, with his aversion to oral history conceded this point (Lowie 1917, p.103). This limited hypothesis was challenged as early as 1923 when Speck showed that Algonkian Indians had a complete herpetology of snakes in their language, including both generic and specific classifications, despite the fact that they made no economic use of them (Speck 1923). Similarly, biologist Lawrence Irving recorded names for 91 species of birds in the Kutchin Indian language at Old Crow, noting that the birds named were not just birds used and that naming had a social as well as economic purpose (Irving 1958).

In northern Quebec, a biologist and linguist have collaborated to record Cree names for fish species, noting the differences between biologists' and Cree classifications. This work has particular immediacy because some fish species have elevated



levels of mercury and it is impossible to issue warnings without knowledge of local fish names as well as the way fish are classified (Berkes and Mackenzie 1978).

In the Lake Athabaska area, in Canada's Northwest Territories, Hohn published a list of mammal and bird names in Cree and Chipewyan languages, though his Chipewyan information seems rather incomplete and his assessment of their classification abilities somewhat short-sighted, given the work of Athapaskan linguists (Hohn 1973).

Anthropologist Cornelius Osgood has recently published an ethnographic map of the Great Bear Lake region, based on his field research of forty years earlier, illustrating the detail in which people know their environment (Osgood 1975). Extremely detailed work of this kind is being done in the Yukon Territory by linguist John Ritter, under the auspices of the Yukon Indian Languages Project.

A geographer working with northern Algonkians, in north-eastern Canada has discussed their cartographic concepts - style, levels of abstraction, areas mapped - comparing their maps both with medieval European maps and with modern maps. He argues that what we choose to include on maps is dependent on our culture. Modern maps depict natural features (mountains, rivers) with great accuracy and symbolize cultural features (buildings, bridges). Indian maps (and medieval maps) do quite the opposite, symbolizing natural features and depicting cultural features like camps or food caches more accurately. He also notes that Indians living on the west coast of Hudson's Bay, like Inuit, have speculated about isostatic rebound:

One of the trappers from Moose Factory explained to me that the shore of James Bay must be rising since he had found sea shells at the top of a seventy-five foot high ridge fifteen miles from the coast. No one had ever told him about isostatic rebound, but he knew what was going on, if not why (Pentland 1975, p.154).

There seems to be relatively little analysis of the content of Athapaskan and Algonkian oral narrative. However, Rooth discusses the importance of oral tradition as a medium to transmit the "accumulated knowledge [fishing and hunting lore] embedded in the legends and myths" in her monograph about Alaskan Athapaskan narrative (Rooth 1976, p.12). McClellan has made an excellent assessment of the historical reliability of southern Yukon, cited elsewhere in this paper (McClellan 1970b).

It seems that linguistic research will occupy an increasingly larger place in any future work of this kind with northern Indian groups and that through study of language and linguistic classifications, we may obtain greater understanding of ethno-botany, ethno-zoology and 'ethno-science' generally.

(c) Scandinavian, Icelandic and Northern Asiatic Traditions

Research in both linguistic mapping and mythology is also being done in northern Europe, though it is less accessible to English-speaking researchers.

A Scandinavian linguist recorded 1600 Skolt Lapp place names and showed how they provide a guide to culture history, land use and environmental perception (Nickul 1964). The names also provide useful information for biologists because they mirror fishing and reindeer herding locations, activities and techniques. They also provide valuable evidence for archaeologists about

locations of ancient sites and nomadic cycles.

One of the richest sources of oral tradition is the Icelandic sagas, recorded in the Islendingbok (Book of Icelanders) and Landnamabok (Book of Settlement) in the thirteenth century.

Scholars like Turville-Petre argue that carefully read, these can provide reliable historical information (Turville-Petre 1953, pp.7, 88-108). More recent scholars have been cautious and have stressed the limitations of the Norse epic (Ciklamini 1973).

Two geographers argue that the sagas can be used to reconstruct the process of deforestation which occurred in Iceland, because they contain references to woodlands where none previously existed (Ashwell and Jackson 1970, p.161). They propose that deforestation was already occurring by the 13th century when these sagas were written down.

The University of East Anglia Climatic Research Unit is reconstructing early climates of Iceland with assistance of a historian who correlates information from a variety of early Icelandic records with dendro-chronology, pollen analysis, ice and sediment cores. She emphasizes the problematic nature of the sources, such as telescoping and inclusion of spurious or inaccurate information. The main difficulty, as with more direct oral tradition, is evaluating the reliability of each individual source, each genre, each work. However, those sources which can be proved reliable do provide useful evidence about climate (Bell and Ogilvie 1978; Ogilvie 1978; Ogilvie, personal communication).

In a different kind of paper, a Soviet ethnographer compared Asiatic and Alaskan versions of the Raven myth, suggesting that

the comparison provides good evidence to substantiate the hypothesis that Athapaskans migrated from north-east Asia. The Alaskan version has Raven travelling over water, creating a rock on which to rest, throwing a spear to create more rocks, then travelling in a whale to a new shore<sup>4</sup> (Dzeniskevich 1976, p.82). While this interpretation implies a conservatism to Athapaskan which may not exist, requiring persistence of tradition for thousands of years, the interpretation is interesting.

(d) Related Research Possibilities

A number of northern scientific research problems lend themselves to the study of oral tradition. Psychologist Judith Kleinfeld has suggested that Alaskan Eskimos may have unusual cognitive strengths which are rarely recognized, used to advantage or rewarded in our society. When she administered tests which involved analysis of spatial relationships and ability to recall complex patterns, they scored significantly higher than their American peers. These strengths in perceptual analysis and image memory, she suggests, could lead to high performance in such fields as engineering, biology and physics (Kleinfeld 1970, p.1-2). Such intellectual abilities may also be reflected in narrative style and may once have been taught and reinforced in oral tradition.

Another research possibility exists in the field of hazard research. The growing field of hazard research often focusses on Third World countries and treats 'progress' as the solution to drought, famine, flooding and other disasters; yet traditional strategies are often quite well adapted to such potential disasters and should be investigated rather than dismissed as 'backward'

(see Waddell 1977, p.74-75). This could be done in part by investigation of traditions about past disasters.

Oral tradition could even have a contribution to make to atmospheric physics. Anthropologist Dorothy Jean Ray discusses myths and legends associated with aurora. Creek Indian, Cheyenne and Penobscot Indian theories about the relationship between aurora and weather foreshadowed contemporary scientific research on the subject (Ray 1979, p.18). Conceivably other relationships between natural phenomena expressed in traditions may warrant scientific study.

### CONCLUSION

The material presented in this paper suggests only preliminary conclusions and general observations. The narratives cited from the Yukon were recorded as part of a larger, more general oral history project and no systematic attempt was made at the time to learn traditions related specifically to scientific questions. Instead, the link between the two perspectives on the natural environment has been constructed here after some reflection. The need for more systematic research on the topic seems apparent from the data presented.

However, it is clear that scientists are interested in oral traditions and that some are using them in their work. A number of books and papers have appeared in recent years assessing the historical reliability of oral tradition, many of them cited in this paper (see also Dorson 1964, Dorson 1973, Vansina 1965). Yet only two works I consulted, one by an anthropologist in Africa (Horton 1967) and one by a geologist (Vitaliano 1973) look specifically at the general relationship between oral tradition and science, and they address the problem only in a preliminary way.

It is possible, though, to state some general observations, first about the cultural dimensions of knowledge in the north and secondly about the practical possibilities for an 'anthropology of natural history'.

#### 1. Cultural Dimensions of Oral and Scientific Traditions

Science and oral tradition are two distinct approaches to



knowledge, developed in two different institutional settings and based on markedly different premises. One combines the written contributions of different individuals: each generation of students can consult vast libraries and build on past theories. The other is more selective: what survives is the collective social thinking of the group rather than discrete individual contributions. The fact that they overlap in specific instances does not mean that one should subsume the other, but rather that there is a possibility for further, cumulative exchange.

Any attempts to reduce oral tradition to 'primitive science' do it a grave disservice:

The contents of folklore cannot be viewed in the same way as the contents of a box of sardines or a scholarly scientific paper. A treatise on metallurgy, botany or geography clearly and accurately contains all the data it wishes to present; and the limited number of inferences it allows are available to anyone with a somewhat flexible intelligence (Heuscher 1979, p.251-52).

Oral tradition does not provide us with a series of data which stand by themselves. It is more like a prism which becomes richer as our ability improves to view it from a variety of angles. The question is not whether a particular tradition reflects the way a particular individual views the world, but whether it broadens the world-view of the listener.

Evaluations of the reliability of oral tradition usually refer to historical accuracy, and here a distinction should be made between history and science. In assessing historical reliability, free interpretation would be considered a disadvantage because it distorts events. In evaluating scientific value, free interpretation may well be an advantage if, as Albert Einstein

asserts, scientific theories are "free creations of the human mind" (Bernstein 1973, p.24). The germs of such creations are as likely to arise from non-western as western interpretations.

Members of each tradition are more likely to perceive the limitations of the other. This distinction becomes clearer when we consider a specific problem such as interpretation of landscape. Scientists, for example, might consider a specific problem inductively by looking at what they consider to be objective empirical facts which can be distinguished from a general background of landscape. Anthropologists have shown that for Indians and Inuit empirical and non-empirical phenomena are often inextricably interwoven (Arima 1976b; Brody 1976; Burch 1971).

Scientists might well consider Athapaskan tradition to be full of fantastic, imaginative episodes, at best a sort of 'primitive science' or 'symbolic literature'. Athapaskans, on the other hand, would consider the scientist culturally impoverished because his view encompasses only half of reality (Irving 1958; Burch 1971). Scientists might argue that members of traditional societies are 'prisoners of tradition' whereas science encourages creative exploration. This assumption has been called into question by Thomas Kuhn who has observed that science is a human activity like any other and that scientists are socialized to work within limited parameters (Kuhn 1962).

Physicists are aware of the limitations of Indo-European languages and move to mathematics when they have to convey precise information. As a result of Einstein's axioms, we have had to revise our traditional idea that time and space is the same for everyone. Relativity binds time and space together so that

" ... there is no judgment of time which can be separated from an observer's passage through space and [it follows] no measurement of space which can be separated from time" (Bronowski 1969, p.22). Significantly, at the same time that Einstein was exploring his concept of relativity, anthropologists were looking at the cultural relativity of time, space, cause and force (Durkheim 1912).

At a philosophical level, then, it can be argued that oral tradition and science are each capable of contributing to an overall field of knowledge, that knowledge has both linguistic and cultural components. The intellectual value of understanding other linguistic and cultural forms, and the kinds of distinctions which they make may be important to the development of knowledge generally. The question then becomes whether there are practical possibilities for combining the two frameworks in northern research.

## 2. Practical Possibilities for an Anthropology of Natural History

Any realistic attempt to combine the two frameworks must begin with interdisciplinary attempts to discover terminological and classification systems used by other (oral) societies, the development of ethno-biology, ethno-history, ethno-science. However, simply trying to learn these categories as an adjunct to western science without a practical commitment to provide a basis whereby they can be developed within the culture is short-sighted, if not exploitative. The most effective and continuing interdisciplinary programmes in the north seem to be in areas where Native communities are very much involved in the projects. Such an approach goes some distance toward narrowing the gulf between local people and 'outside experts'. If orthographies

and traditions can be recorded for a particular culture, future generations may have a basis on which to build their own intellectual tradition. Both anthropologist Jack Goody and linguist Michael Krauss stress the intellectual freedom permitted by recorded information which can then become a basis for cumulative knowledge and can grow, expand, and change. At the present time, western education systems are heavily weighted against indigenous systems of knowledge, though there have been recent attempts to change this in some parts of the circum-polar north.

This raises a major objection to the entire question, "Can oral traditions contribute to science?" because it so clearly fits the universal pattern of exploitation of Native peoples whereby professionals (anthropologists, linguists, and archaeologists) build careers on the basis of information solicited from Native groups with no benefits to those groups. 'Knowledge' becomes re-interpreted to fit the dominant scientific framework. Practical questions should focus not on "getting information before it is too late" but on developing mechanisms for returning it: school curriculum projects, local museums, usable orthographies and training for Native people who want to work with and develop those materials. There is also a need to provide training in science-related fields for northern Natives interested in such areas as forestry, biology, zoology, linguistics or fisheries. The fact that there are few if any Indian or Inuit scientists in the north is regrettable for both northern residents and northern sciences.

Interdisciplinary research is playing a significant part in contemporary northern research. This could lead to theoretical

model-building in the north for both past and future environments, a subject of interest to both scientists and northern Native populations. It has been argued that the north provides an ideal setting for studies of long-term physical and social change since the time of the last glaciation. If a model can be developed for the north, using data from ethnography, oral history, climatology, archaeology, palaeontology, it can be applied to more complex ecosystems further south (Burch 1979, p.73).

Model building also occurs in the study of contemporary environments. At the present time, there is great concern about the impact of industrial development on northern ecology, yet northern biologists, zoologists and other life scientists have only relatively short chronologies on which to build their predictions and management plans. In the Yukon it is still possible to record traditions about areas inaccessible to scientists except during short field seasons and for time periods before records were kept.

In summary, then, considerable attention has been paid in the literature to ways in which historians can make effective use of oral narrative. No comparable analysis has been made of its potential value to scientists even though scientists make assumptions about how it can be used. Oral tradition may contain unique information in the north, where other documentary sources are lacking. A systematic study of the two approaches, oral tradition and science, in a specific geographical area like the Yukon, might be able to make an essential contribution to an 'anthropology of natural history'.

Notes

1. Because of the linguistic complexity of the Yukon, the nine women with whom I worked during those years spoke seven different languages - Tagish, Tutchone, Southern Tutchone, Tanana, Han, Gwich'in (Kutchin) and Tlingit. In addition, they all spoke English. This clearly complicates the problem of recording in original languages; while I know words and phrases from each language, I speak none fluently. Consequently in all cases but one we relied on English for recording, and in the one exceptional case a Tutchone woman, with linguistic training, transcribed the story in her language and then translated it to English. With the development of Athapaskan orthographies, the possibilities for recording and transcribing stories in both Athapaskan languages and English will increase.

There are serious objections to recording in English, one being that English provides no material for the study of linguistic form (Boas 1940, p.452), another that certain ideas cannot be translated from one language to another (Whorf 1956). However, with certain limitations which are discussed elsewhere in this paper, the stories recorded seem to provide material for preliminary discussion of Athapaskan oral narrative.

2. Skookum Jim once saved the life of a frog and she later appeared to him in a dream and guided him to the discovery of gold. Klenähidāk and her child were sole survivors of a village attacked by two wild children. From that time, she has wandered with her baby and when a human being hears her he should follow a certain ritual after which he will obtain wealth. Skookum Jim heard the baby, and followed the woman; however, he did not actually catch her and consequently his fortune did not last.
3. This is the same volcano discussed by Dr Carl Benson in a recent lecture at the Scott Polar Research Institute, February 23, 1980, and in a paper where he alludes to oral tradition (Benson 1978, p.2). De Laguna is preparing a manuscript on Copper River Atna to be published in the near future and it may deal further with volcanic traditions in this region.
4. Translation of relevant parts of this article was kindly provided by Dr Terence Armstrong.



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APPENDIXNałudi': Story of the Lowell Glacier

(Mrs Kitty Smith)

This glacier's name is Nałudi' . This is the story of how it came across the river and made a lake.

One man lived way down there, Yok'dat (Yakatat) they call it, way down there. People lived at that place, near salt water. Kluksu River goes down to that place. From there, people came up to this Yukon. One old man is coming and a little boy about so big.

(When they got here, they met an old man, a Yukon Indian.) That old man had no hair on his head, nothing.

The little boy who came from Yok'dat told him.

"Ah, that old man! The top of his head is just like the place gopher plays, a bare stump". That kid laughed at him.

The old man who was with him said:

"Don't say that. You don't know that old man. Why do you say that? That old man is your grandpa. When you're old your hair is going to be that way too."

Well, that old man comes from Yukon, you know.

After that, they went back.

Summertime, that old (Yukon) man went to Nałudí' .  
He's medicine man, you know, big doctor. That ice was  
coming right down from the mountain. At the end of the  
ice, a creek came down. Right there, he sat down.

He said to himself, "What am I going to do?" His  
doctor talks to him. "You think I'm going to bring that  
glacier to this mountain? It's going to be flooded, that  
side."

His doctor told him, "You try it. It's going to come."

That old man lay down, right there. His doctor's  
working now on that glacier. It comes down, comes down....  
glacier....glacier....comes down....comes down....until  
it's all level with this mountain.

That's the first time (the glacier crossed) that  
Indian doctor did that.



After he did that (another time when it crossed the river) my grandma told me it was like that one time, in her time. All flooded again, that 1016 (Haines Junction), that way. Talk about gophers die! she said. Before, that glacier didn't do that. But after he did that, first time, from there it started. (The barrier was formed and broken several times).

That man stayed there on top that glacier until that water is filled up. Champagne landing, everywhere is all full with that water. There's a water place shows that yet.

"All full now" his doctor said. "You know how far I'm going to clean them? Pretty near to the middle of the mountain all I'm going to wash down."

"Alright. Break it down now" he said. It broke down, that ice. Water goes now.

People were staying at a flat place where Champagne Creek (Alsek River) and Klukshu River (Tatshenshini River) meet. Some kind of coast Indian people. All died there people. All washed down to salt water. Just that one

man saved, that one who told the boy not to make fun.  
That's the one he saved, that's all.

All cleaned right out. They say they saw water  
coming half way up the mountain.

That happened before my grandmother's time. But  
(in her time) that ice still goes, touches that mountain;  
that time the water was still full.

I've been there, Nařudi'. That's the one that  
broke.

It's a long time since that ice met that mountain.

When my grandmother was a little girl, she stayed  
at Dalton Post all the time. That's the time she said  
all the time they cook, they don't use cooking stick.  
They boil food. They don't let that soup run over too  
because there is danger in that ice. If that ice smells  
grease, he don't like it. Should be people just boil  
meat. (If he smells grease) that's the time he started.

Just goat and sheep there, no moose, no caribou.

There was a flood in my grandmother's time, though. But not as big as when the old man did that. It's after him. In his time that ice came just up to that mountain - that's why they called it Nałudí', "flat right there". Right there, there is a big creek coming, bigger than the Klukshu River. That creek came from the mountain.

That was before me, in my grandmother's time. Maybe I was just born then. August, they go to Kluane. Indians walk around like that. Kluane people, Big Lake people. They're friends together. They're going to Kluane, I guess. They stay there, come back. Flooded! Bear Creek is all full of water. They stay on the other side.

That's when one old lady told me, "Talk about gophers" she said, that flood. Lots of gophers there. No trees, I guess, just gravel, willows. Just a little while, that flood. That flood was just a little while, just to Bear Creek, then he broke down again. Dry. I don't think this time it does that for a long time.

(Later, discussing glaciers again, Mrs. Smith summarized):

Glaciers don't like to smell grease. If it smells grease an eye (of the animal living under it?) comes out on top. It becomes so hot that it is just like being in a stove. Lots of people know about this.

I asked Jimmy Kane just a little while ago,

"How is that glacier. Is it still like that?"

"Oh, I don't know. I don't hear anything".

I guess it should be yet. If something (the animal) is gone, that ice is going to melt out. There is something inside. That's why that glacier is there. That's the one where his eye came out, people say. If he comes out, if there is nothing there, that glacier is going to melt.

That owl they killed, I told you, they came from that ice. It was just full (of ice) they say. Big glacier. One of those owls choked on a bone. One burned. See? There is no more ice there (at Nukwa'ik) now. Before there was ice there, as wide as Marsh Lake.

When that owl was killed, they all melted out.  
There used to be a glacier at Nukwa'ik people say.

But people cook bacon, everything this time and nothing is wrong, they tell me. Jimmy Kane told me. But something is in there yet. If they cook gopher grease or something, it's going to start again.

I don't believe that it is over. My grandma told me too, my Daddy's mother. But she's got husband already, that time she sees them, those eyes. They run away. Too hot, they say. Everything started to talk: groundhog, gopher, geese. You can hear everything talking. That time they ran away. They packed up - I guess they didn't have much meat. They got a good place, got saved. That meat is just like it is cooked.

That's Dadzík, down Dalton Post way.

Another ice, Tānshi, closed Mush Lake, my grandmother told me. That's the one my grandmother said, "Two came out. That's why we started". She doesn't lie, my grandma.

That time (recently ± 1900) when Nałudi' came across that time the lake was full all the way to Haines Junction. That time two sisters with one husband were staying pretty near 1016 drying meat. They went up the mountain: they had a camp there. It all flooded down there. Yes, it broke down after a while. One of those ladies told me there were lots of gophers there, dead ones. Just full of gophers. They packed them in. "Talk about gophers! I wish you were coming that time", she told me. "That water dropped down in the morning when the glacier broke. My husband packed in a big bag of gophers. Then we started, dogs, everything, lots of gophers".

Since the doctor did that the first time, it happens again.

Some young people don't believe me when I say that. But I don't say that, people say that.



Dádzik

(Mrs Kitty Smith)

That's the name of another glacier, I'll tell you.

Bad place, that place, they say.

One time when Mary Kane's father was a little boy he went hunting with his Daddy. Later, when they told that story he said, yes, I was there. Lots of people hunted that time. It was just goats they hunt; they shot lots of things. No caribou or moose there, though.

One old man said, "Take good care of that grease. The wind is blowing that way (across?) the ice. I smell grease strong when I walk around. Look there, at that grease". He takes off from that ground.

The creek went down that way to Dalton Post River. My, some people were getting excited. Already it's getting dark now.

Somebody left for a few minutes, go to toilet. When he came back he said,

"Gee I hear groundhog whistle up there".

Funny how game talks that way just at nighttime - gopher, geese, just for nothing they talk.

Then it started getting light on top of the ice; the side was just getting warm. People start to sweat.

"Well", that man said, "we got to get away".

They started.

That little kid, his dad held him. Meat, blankets, everything they left, just get away. When they begin to move down, they see eyes, just like a sun, on top of the ice. Two eyes came up when they went down there.

Getting hot now. Too much heat, just like a stove. So they went in the water, shallow water. They went away down there (downriver) about five miles. They got over there. Over there they camped.

Gee whiz, day time now. Sun all come out, now everyplace. So they went back again. That meat is pretty near cooked, they say. I don't know what did that.

They told Jack Dalton about that story. He married an Indian woman, used to be, at Dalton Post. He went down there, took a horse. But it was too hot, too much. That horse fell down just like he was sleeping. Then he went in the water, him. He let that horse go - dead. Too much heat. They say he came back without his horse, nothing.

Dádzík, they call that place. It's a big glacier, that one.

Below Dalton Post, on Dalton Post Creek. Everybody see that. I guess my grandma too see that, run away, when my Daddy is a baby.

That place they made grease was bad.

There's another glacier, Tänshi' same, down from Dalton Post.

That Tänshi'; that's the one Jack Dalton tried. That one's different from this Dádzík, that story I tell you. I've been at that Tänshi' too. No good, that place, used to be. Not far from Dalton Post.

Woodpecker Got His Snake

(Mrs Kitty Smith)

This is story of echuch'ia gyukinshän - "Woodpecker got his snake".

This is a story from along time ago, I guess, from the time when Crow made people, that's the time.

This is a story about Woodpecker.

Wolf, he married Woodpecker's daughter.

One time Woodpecker said, "My, I see moose tracks. I see fresh moose track going that way."

"Where?" asks his son-in-law.

"Up there. You see that tree? That's cow moose".

Wolf knows that's not cow moose, but he goes there. Gee, he sees no track, no track, just owl, and that owl flies away.. Finally he looks around all over and he comes back.

"Where does your daddy see moose track?" he asks his wife.

She asked her daddy, "Where do you see moose track?"

"That place".

"Well, nothing there. My husband has been there and he saw nothing. Just owl too - Nàdà'. That's all he sees. It flies away too."

That Wolf man is mad about that - just Nàdà' there.

"No" says Woodpecker. "That's cow moose and calf over there."

So, he went again, that son-in-law, and he killed that Nàdà', brought it back.

"Daddy" that daughter called. "He got all two".

She carried that owl around - not heavy, you know. She put it there, wood pile place.

"My goodness, she pack around cow moose", her father say. "Ah, that's heavy".

Well, they start now. Woodpecker kids too. They cut up the owl, hang up head, just like moose head. Cook it.

"Give the best head part to your brother-in-law",  
Woodpecker tells his sons.

They cut off the nose and give it. He laughed, I  
guess, that Wolf. Just like he eat for nothing. They  
all eat, but they say they gave the best part to Wolf.  
I guess he threw it away, pretended to eat.

Then, after, he hunted. That Wolf got cow moose-  
real moose. He brought in the fat, told his wife.

"Ah...." he said. It's heavy. He told his wife,  
"Hey, I got in a glacier and my snowshoe froze. See?

"Bring them here".

He brought them. She put them near the fire to make  
them dry. That old man, her father, Woodpecker, is  
watching.

"Ah....my daughter, that's bear den. Bear owns  
that glacier ice, that ice frozen on snowshoes".

She doesn't know what he's going to say, that Wolf.



That Wolf said, "What does your Daddy mean? I got in water. That's what's on my snowshoe. What kind of bear stays in that kind of place?"

"Well, I don't know that", said his wife.

In the morning, that Woodpecker tied up everything, sharpened weapons for his kids. They're going to go there. They're going to try that bear den. But he doesn't see bear den, that Wolf man. He just sees glacier going that way.

"My son-in-law, you come too", Woodpecker tells him.

He comes, looks around.

"Yes, he's sitting there, (that bear)".

That man doesn't know what he means.

Woodpecker bangs his stick on the top of that ice....  
bang....bang....bang.

"I don't know why he won't come out", bang....bang....  
bang.

Woodpecker does that. Wolf man, though, he just stand there.

Woodpecker stopped:

"My packsack. There is something inside will bring that bear on top this way. Get your husband, my daughter. Send him to your Mama. She knows that sack. Tell your husband to get it from my packsack, my daughter. Your Mama knows my sack."

Wolf ran back:

"Bear doesn't come. Get that sack your husband wants."

"Oh", that lady looks around. She gets some kind of thing, gives it to him. He takes off, that Wolf.

"This one?"

"Yes, that's the one" said Woodpecker.

That Woodpecker tied it on a stick and put it on top of ice. I don't know what it is - he sent for his doctor (medicine) I guess.

Crack. He bust that ice. Something came out of that ice - big snake. They poke it, Woodpecker's kids and Wolf man. They kill him.

My, lots of fat. They cut it up, pack it home. Wolf doesn't eat though, just his wife eats.

"I don't want it", he said.

Woodpecker said, "Don't you kids leave any cooking stuff (cooked food). Don't save any cooked food. Eat it all."

Wolf thinks, "I don't know what he means. He takes a little bit of his wife's cooked food, hides it away. Just a little piece of cooked fat. It froze there, I guess.

They left the rest of that raw fat to lie around 'til tomorrow. Fix it up tomorrow.

Next day, they wake up.

"Ah....". All that fat turned to ice. Just that little piece of meat he saved, that's all. They should not have saved that little piece of cooked meat. That's why it turned that way.

That old Woodpecker got mad. "Who did that. We wanted to eat that good bear meat!"

Wolf went hunting. He got bear, killed it, brought in the fat. He brought it to his father-in-law:

"This is bear. You say bear for nothing".

That Woodpecker wants to even up. He saved a little bit of that cooked bear fat. They eat that fat and tomorrow they go to get that meat.

But that next day, nothing wrong. He didn't even up, that Woodpecker.

Echuch'ia gyukinshän they call it. From Dalton Post way down, a little way. "Woodpecker, he got snake".

Long time ago, it's like that, I guess, when Crow turned animals to people, that's the time.

Falling Through A Glacier

(Mrs Angela Sidney)

You know people used to go down to sell their furs on the coast? One time my father was going to come back and his trading partner, the one who buys furs from him all the time, is going to come with him. Here they started from Xkut (Chilkoot) lake, between Haines and Skagway. At the end of Xkut, they started coming back that way. They came out at Robinson or some place like that. And here there's a glacier they have to cross. My daddy got across but there was a crack in the glacier and that man behind him fell in. I don't know how he did it.

My daddy didn't know what to do. If he died there, he thought, they're going to blame him for it, think he killed him or something. So he hollered at him, and here he answered.

"Are you okay?"

"Yes, I'm okay".

"I'm going to try to get you out. I'm going to untie my pack and I'm going to send the string of my

pack rope down to you. And you tie it around your waist and climb up. I'm going to keep pulling it too. Put your elbows against the glacier wall and climb up. So he did. He untied his pack, my daddy, and he tied a string around a stick and let it down to him.

"You jerk it when you got it", he said. He felt it jerk. "Put your elbows against the glacier and try to pull yourself up. I'm going to keep pulling you too." He kept doing it, and finally he got himself out of the glacier. Finally he came out.

They came out of the pass around Robinson or someplace around there and they went over the mountains this way to Tagish. That pass is between Robinson and ġkut. There is a valley there - I heard them talking about it.

That man's wife said that her husband talked about it all the time; Kodénaha is his name. My father was a young man. He never stayed with my mother yet. That man stayed with my father quite a while and then he went to Dyea.

## Falling Through A Glacier

(Mrs Kitty Smith)

This is a story about coast Indians, story of Kanakh.  
This happened at glacier in the way from Klukwan to Lake  
Arkell (Kusawa).

Two coast Indian men went from Klukwan to get fur,  
skins. They got ready, took guns - guns already that time  
too, I guess.

One of those men told his wife, "We're going to stay a  
long time there, Yukon. We'll come back in August. We're  
going to stay there all summer."

That's what they said. They're going to trade some  
things. (Yukon) Indians got fur all the time. There's  
no store that time.

They're gone. Two people - a man and his brother-in-  
law. One married the other one's sister. They stay Yukon. They



buy fur - trade them, you know. That man has got lynx skin blanket he buy.

They're going to go back now, to Klukwan. They started. They got lunch, I guess. One woman tells them, "I'm going to fix some lunch for you. You give me this chew (tobacco) for nothing."

She smash dry meat, make grease, put it in a big bag, that lunch. Lots of meat - just smash like flour.

That man thinks, "When I come back to Klukwan, me and my wife are going to eat this". Some dry meat they got, some fat too.

They go back now. They follow foot trail that way used to be. Glacier there, used to be. They go across this far (to the top). That glacier goes across to the mountain. They eat lunch there, start to go now.

They walk now. Just in the middle, he falls down, his partner. Down the crack in that glacier.

The other one is scared now. Just like smoke come out. His partner is gone. I guess he holler, he pokes in that

(on a rope). He's going to look for the body. If he finds the body, and if my uncle is dead, we're going to kill him so that slave will be his partner.

They go now. Just those who are going to carry the body go.

That man is still there, over a month. Sometimes that man sleeps, he sleeps warm, I guess, warm fur blankets. Sometimes they bring dish there and he eats. I don't know who brings that dish: when down in Klukwan they make potlatch I guess they call out names and throw that grub in the fire and I guess it comes to that man down there.

Well, people go to that place now. They're going to find him now. That man's partner put post there, marker, his walking stick he put there to mark.

"Right there, right there he fall down."

His brother old man too, coming.

"Ayyy....." he call "You die right there my brother."

That man he hear down there.

"Ayyy..." he holler back.

"Somebody holler down there".

"Who hears him?"

"I hear too."

"Who hears him?"

"I hear him. Somebody hollers."

"Aye....Aye....." they holler

"I'm living yet. I'm living het", he say that down there. Oh my!

"There're going to put string down there. Look for it" they tell him. Put little rock on that.

"I got him" he holler. He ties up his stuff.

They pull up. His stuff comes up! His pack, fur, everything come out there. Now his body going to come.

They send down wide belt. Going to tie up (around his waist). He tie up. Strong rope. Now they pull him. He

come up - he's fat! He's alright, one month.

"You alright? You starve?"

"No, I'm alright."

That woman who fix him lunch, she smash that grease, that meat. He eat that good.

That slave is saved. They give him to that man.

"This is going to be your own. I give it to you uncle. He's going to take care of you. I was going to kill him right there where you died. He was going to stay here too. You're saved.

They walk now. From there, they make boat, go down creek.

Two men got in one boat. They will go fast, go to tell people down there the story.

Down there, people talk. Those two men came to Klukwan. They holler:

"Ah.....Ka nakh comes back. He's not dead, he's coming down."

My goodness. His wife jump in the water. He's got two wives.

Boat is coming now. He's wearing skin clothes he bought from down Yukon. Ah, fancy clothes. Everybody comes.

"Ka nakh? You?"

"Yes. I'm living."

My, everybody is surprised. Big potlatch, they paid for him, but he's come back again.

The Year Summer Never Came

told by Mrs. Rachel Dawson, Whitehorse

I told you about that year summer never came? Two winter together. It was like this (weather now) only heavy frost, just thick they said. No snow, but just like ice all over, and they're joined together. Just about little better than a hundred years now. Young moose born in springtime, they just freeze right onto ground. I guess they're wet. The Indians, they look all over in the woods they say for that kind. When they find young moose frozen they cut it up and they eat it.

My young grandfather's father dig up lake. That's not my real grandfather, that's his nephew (who) was given to my grandmother after my grandfather died. They do that, you know, Indian. Like if something wrong with my old man, his people got lots of relations down there. His relations got boys, she could tell one of her boys "You look after your grandpa's wife. Live with her. Look after her." That's what he did. He stay with her just like he's married to her. He was baby then. (when two winters joined)

It was so cold that lake just froze right down to the bottom. Ice right through, no water. So my grandpa's father took a chisel, *tanda* they call it Indian way. He dug a whole lake up, how big that lake. Sometime he get to fish. He take it home and they make soup out of it for kids, they got lots of kids. Like me I got lots of grandchildren down there. (That lake just be after Minto on right hand side as you go up Taye Lake (?) Thetso Lake. There's lots of jackfish in that and they're good to eat.) He dug that whole lake up, then go home eat a bit of soup with his kids. He tells his wife, "I'm going to go look out, just see if any moose coming around." No gun. They just got bow and arrow.

He sit down under tree. He got his packsack he sit on and rest. I guess he's tired and weak without eating. Starvation. A lot of people starve in Yukon that time. He sit there and he hear something running; you could hear it run on the ice, ice break under. So he open his eye and look. He keep still. He got his bow and arrow all ready. He just hold it. Here that cow moose come down to have

her baby. He shot it. Just one shot he got it. He open it. He took the guts out and he go home to tell his wife. "We have to move," he said. "I can't pack all that meat. I got moose down there." So they all move down and they make camp right there. She cut meat, she dry them. She cook for the kids. Everything like that.

Just then my older grandfather--my mother's father--came back from toward Mayo. That's the one they say he got ten wives, ten men to work for him. They come back each of them pull toboggan. They got dry meat and dry fish and everything what you could think of--berries, blueberries. When they come back that way they saved a lot of people.

Then spring come and it get warm and everybody get better again.

### The Year Summer Never Came

told by Mrs. Angela Sidney, Tagish

What part I know on this side, they said two winters joined together. Maybe not all summer, I don't think, maybe late spring, I guess that's what they mean. And everybody just about starved out. Had hard winter, what they call hard winter.

There's one man, I don't know what his name is. Anyway he killed some moose. Cow moose and the young ones and that bull, I guess, late fall, in the winter time. And here at the end I guess he started to make camp first instead of going to the moose and trying to dress them or something. And here he passed out after he make the camp. He pass out. And when he come to he went to see his moose and here they were gone. They took off. They just dropped. Maybe they didn't get hurt. And here they were gone. There sure was awful luck that time they said. Sure must have been awful. That's why they tell about it. That was before my time.

A long time ago that happened. Why my mother was just a child that time I guess. That's her mother, they stayed in Carcross I guess. Carcross, they call that place (Natassahéen). Tlingit name I guess. Means "Water going through the Narrows." She's narrow there you know. Caribou there. They live there I guess.

My great grandmother, I guess it was, used to go to Carcross there to that mountain there, I don't know what they call it. I see they call it Caribou Mountain. They say where the snow all melt she pick some stoneberries. From there when she gets home she make soup out of it for the children.



People went there to where the fish—when it thaw out quick you know when the river open place like that they start fishing. That's why they all went to that place. Some went through to Atlin, I suppose. I just know about what my mother tells me, you know. I don't know about other people. But that's when Johnny Ned said people eat each other. I never heard of that story though. So I don't believe it. It's not true I don't think.

That was before the goldrush. My mother was just a child I guess that time. She's the one who tell me about her mother used to go to that mountain, pick berries to make soup for the kids.

All over the Yukon every place they say. In Teslin it happen too. Mr. Fox, Jim Fox, was just a young man they say. He went out hunting too. People start to travel to go travel someplace and he went ahead to go hunting someplace. And he know where his people are going to stop. I forget about this story. My husband used to tell it. That's his granduncle, I guess, his mother's uncle. Mr. Fox, Jim Fox.

Anyway, he kill five caribou. And after he dress them all and everything here he camp. He had to camp because got to lake I guess. Anyway he brought one of the liver back and he cooked it and he eat it. And here that night he got sick. You know when not eat a long time and then eat something? He got sick. That liver made him sick. Anyway, the next day, well he couldn't go next day, had to stay there. And towards evening I guess he started feeling better. So he got wood, pack lots of wood and then he start cooking. So he could take cooked things back you know. He can't go anyway, it's too late to go. So he started to cook some caribou, the shoulder, the whole arm I guess, two or three of them. That's all he pack. Enough for what he could pack, you know. Anyway next morning, early morning, he start going. He catch up to the people where they were going to go.

Here when he come out to that lake, I don't know what they call it in English, just Indian way they call it *T'ati'a*. The moose, caribou and everything in winter they poop all over the place. Moose dropping. That's why they call it like that. Means "Moose Dropping Lake." I don't know what they call it in English.

Here he see something black out in the middle of the lake. Well he know very well who that be so he walked right out there and here it was his uncle, *Tan Kok'la*. Here he was fishing, fishing through the ice. When his uncle look up at him he sure look awful he said, no meat on his skin just awful looking he said. He put his pack down there and he just gave some cooked meat to his uncle right there.

Here he was sitting. And then he went not very far, I guess. Well he went across the lake I guess. That's where people camping. My old man's mother was just a child, just a girl I guess, that's the time it happen. Don't know how old she would be, just four or five years old, I guess. That's the time it happened. That old Mr. Fox used to say to my old man, "A-se" well that's his sister's niece I guess, "A-se, look how much I save you. You wouldn't have been here if she died," he say. That's what he always say. He always ask him to think about that. How many people he save.

One man starve. They don't think he starve they say, think he had heart trouble. It was so cold, I guess, and here people make fire on the way, that's the way they travel, you know. When it's cold weather they make fire here and there all over and when the kids, everybody, get warm enough again they go again to next place. Next fire there they warm up they say it was cold too. Very cold. That's what brought on that starvation I guess, you know. Wild moose you can't come closer. Too cold and snow make lots of noise. They take off. Long ways. Caribou too. That's how people starve out.

(Q. Did many kids starve?)

No, not much, only one man, he's grown man. That's the one Mr. Fox say he don't think he starve. Where they make fire you know across the fire it melt, you know, and here he took out his spoon, he start eating that wet snow. And he think that's what make him die. His heart got cold, I guess, and he got a shock. People never do that eating snow. When it's cold your heart get cold and something's bound to happen. Nobody died at Carcross, either, I never heard that. Maybe not so much fish at Selkirk. But where stream was, Carcross never froze before they put the dam, but after they put the dam it froze up. So's Tagish too. That Marsh Lake Dam. I guess water start running so fast once, you know.

That's all I know of. They say all over it happen.

Si män'

(Mrs Kitty Smith)

My grandpa, my Mommy's Daddy tell me this story.

Mush Creek goes into deep lake, cold lake. Si män'  
they call it. (Red paint lake)

He sat on top of a mountain hunting when he was young. He's got wife already. My mother is a baby that time.

Six caribou went across that lake.

Right there, he sat down. Some people with him. Two men. Three of them together. Six caribou go across that lake.

"Look at that caribou go across to the other side."

Right in the middle of that lake, just like a sack, they got to go that way (a whirlpool). Those six caribou went down in the water, never come up. That water just turn round and round. He's not dreaming. My grandpa is an honest man.

Tashal män' (Bates Lake)

(Mrs Kitty Smith)

My grandpa, my Daddy's Daddy, Doc Scottie used to be a policeman. He told me this, but he didn't see it himself. He saw the place where it happened. It was at Deep Lake, they call it, Tashal män' (Bates Lake).

Somebody camped at that Lake, just hunting. They cooked some kind of meat, grease, I guess. They got pet dog.

Don't know how many people were there. My (other) Grandpa was there too, my Mamma's own. Somebody had a little dog. At night time, that little dog is barking.

When they heard him, trees broke. Crash.

"Ah, something is wrong". They ran away. They had no blankets (when they ran away). They went on top of a mountain. They lay down, I guess.

Daylight now. They watched down there, their camp. No, nothing. Daylight now.

One man said, "Well, we've got to see what made that."

Lots of people. About five or ten, I guess. They went down to their camp again. My goodness, trees were knocked down about this far (a few feet) from the ground, for about this far (indicating the edge of the lake). Something came out of that lake. Snake, it looks like, they say. About that much (depression) in the ground. Then he turned (around) this way, that time, after those trees broke. It's just like they clean all the trees off and leave the grass.

I don't know what it was. They saw one man say some kind of rock - a big island (before this). On top, a big head came out, then another. Two. I don't know (where) that one though. Nobody believe him.

That time (I'm telling you about) one man said,

"You see that one man said he saw that kind of think lay down on top of that island? This one, down in the water must be like that.". That's what he said. People didn't believe it before.

"You see this place now? It smells funny too."

Funny, eh? That thing came from the water. That little dog barked (so that snake tried to get him).

That snake knocked the tree down with his head and went in the water again. I guess he scared that dog.

Lots of bones on the shore, they say, from animals he ate.

This was at Táshal mǎn' near Nałudí' Deep Lake, white man calls it. (Bates Lake ) It doesn't freeze much in wintertime, just a little bit.

One time Jack Pringle used to be policeman (North-west Mounted Police). He married Susie, my grandpa's sister. He went marten hunting with my grandpa, (Doc Scottie). He (Jack Pringle) said,

"We're going to go on that ice. We'll camp on the other side."

My grandpa knows that lake, you know.

"That lake doesn't freeze all winter, just snow on top, that's all. Maybe a little ice." He told him.

That white man didn't believe it, you know. He does that (tested the ice). It's true; it's just a little thin. It's after Christmas.

That time he asked my grandpa, Doc Scottie,

"What makes that lake like that, Scottie?"

He told him. "Something is in the water. Something like a snake", he told him. "It came to shore: that little dog was barking."

He scared that dog, I guess. They find lots of bones in that lake, I guess. Game bones, I guess he swallowed them.

Whitemen used to know about that lake too. One man made a boat there. He told my grandpa,

"I don't go to that deep lake there. I don't want it. It looks funny to me. I don't go on that one, just on Mush Creek Lake (Mush Lake) I trap around on top."

Well, it's true.

Tashāl mǎn' they call that Deep Lake (Bates Lake)

Mush Lake, though is Si mǎn'



Little Creek runs between those lakes. From  
Dezadeash, a road goes to Mush Creek Lake (Mush Lake),  
from there, little creek; from there, Deep Lake.